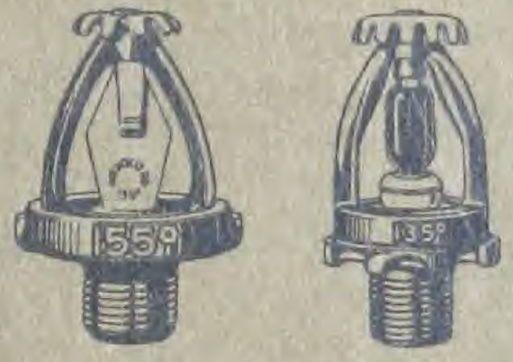
The Care and Maintenance *of an* AUTOMATIC SPRINKLER SYSTEM

Fourth Edition—1927

Solder Type Head

Over 45 Years of Supremacy



Quartz Bulb Head

Betters the Best

THE GRINNELL SPRINKLER HEADS

IMPORTANT

Hang in a Conspicuous Place

GRINNELL COMPANY

INC.

Executive Offices

Providence Rhode Island

The
Care and Maintenance
of an
Automatic Sprinkler System

Fourth Edition
1927

Reprinted 1928

Index of this book on Pages 98 and 99

You will be interested in the article on pages 94 and 95 describing the work of our Inspection and Service Department, organized to assist owners of Grinnell Automatic Sprinkler Systems in the care and maintenance of such equipments.

GRINNELL COMPANY
INC.
EXECUTIVE OFFICES
PROVIDENCE, : : : RHODE ISLAND

Photo by Brown Bros., N. Y.

Foreword

A fire like this may ravage the plant for which you are responsible unless the automatic sprinkler system is kept in first class operative condition. Given adequate care and maintenance, automatic sprinkler equipments are the most infallible protection known to man.

A single closed valve may cause untold ruin. Be sure your duty is performed carefully. The future of a going business—the jobs of your fellow employees—even their lives—may depend on the way you look out for the fire protection equipment which is entrusted to your care.

The Care and Maintenance
of an
Automatic Sprinkler System

In more than forty-five years of actual performance automatic sprinklers have won for themselves a unique place in the fire protection world. During this time they have extinguished with trivial losses thousands and thousands of fires which otherwise would have developed into very serious losses, and would have set back by an untold amount the industrial development of our country.

So remarkable has been this record of accomplishment that in some ways a booklet seeking to increase sprinkler efficiency would hardly seem warranted. However, of late years there have been several very severe sprinklered fire losses which might have been prevented by simple precautionary measures.

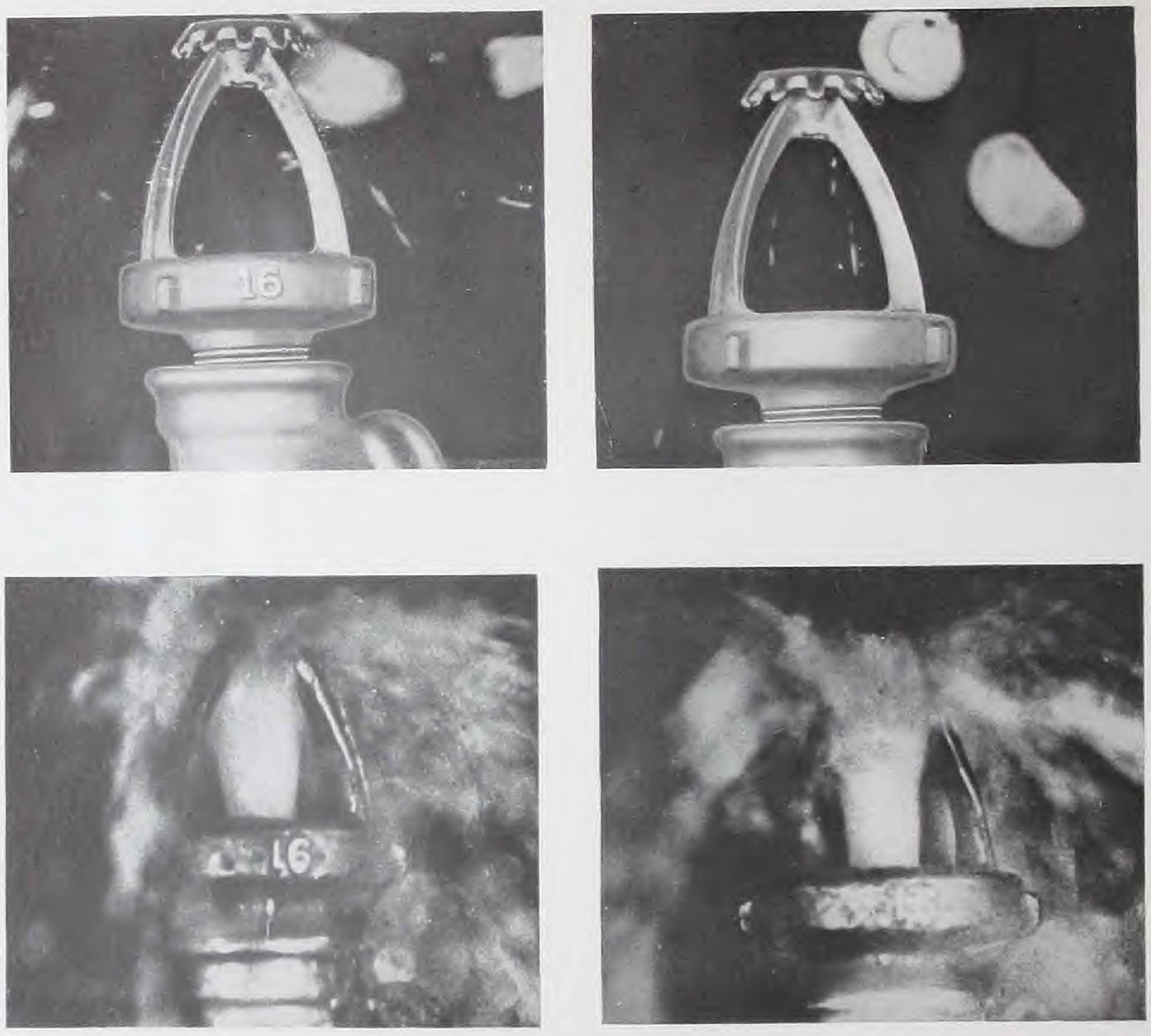
Further than this, the mass of data in regard to sprinkler performance is now so complete that the causes of so-called sprinkler failures are clearly indicated and by an analysis of these causes owners of sprinkler systems can see just what features of their equipment should demand the most attention if they are to be kept at its highest point of efficiency.

The purpose of the Grinnell Company in issuing this booklet is to bring this whole matter of sprinkler system maintenance as forcibly as may be to the attention of sprinkler system owners and to provide in usable form certain information which we hope will be of assistance to those in charge of maintaining sprinkler equipments.

Before passing to detailed instructions on the care and maintenance of a sprinkler system, we wish to indicate the method which we have followed in presenting the subject. Under the heading, "General Instructions," we touch on some of the more obvious features of sprinkler system maintenance and then give detailed drawings of sprinkler equipments provided with various sources of water supply.

Each of these drawings shows only one supply and sprinkler system owners having the usual two source supply system can get

full data by referring to the individual drawings on each of the supplies they have. For instance, the owner who has a system supplied by city water and a gravity tank would consult the drawing showing the sprinkler system with city water supply and also the drawing showing a sprinkler system with a gravity tank supply.



THESE STRIKING PICTURES OF A GRINNELL SPRINKLER HEAD GOING INTO ACTION WERE TAKEN WITH A SPECIAL HIGH SPEED MOTION PICTURE CAMERA

The dry-pipe system is shown separately and developed only as to the dry-pipe feature, the water supply feature of the dry-pipe system being, of course, exactly the same as in a wet pipe system.

The above mentioned drawings twith heir detailed descriptions show only the less technical features of the equipment, the details of different devices such as a dry-pipe valve, fire pump, air compressor, tank heater, pneumercator, etc., being treated in detail on pages 30 to 93.

General Instructions for Maintaining a Sprinkler System

No better method of conveying general information in regard to the care and maintenance of a sprinkler system can be followed than by referring to the table of so-called sprinkler failures as compiled by the National Fire Protection Association. These fires were by no means all total losses. They are simply those fires where sprinkler control was not as effectual as is usually the case. The fourteen hundred and sixty-one unsatisfactory fires noted below are those occurring in over thirty-four thousand seven hundred sprinklered fires and are arranged in order of their greatest importance:

SUMMARY OF UNSATISFACTORY SPRINKLER FIRES.

	1897–1926, incl. No. of Fires.	Per cent.
Water shut off sprinklers	441	30.2
Generally defective equipment / Unsprinklered portions	289	19.8
Defective water supply or supplies	130	8.9
Sprinkler system crippled due to freezing	42	2.9
Slow operation of dry system or defective valve	38	2.6
Slow or defective operation of "high test"* heads	25	1.7
Faulty building construction, concealed spaces, vertical openings, etc	73	5.0
Obstruction to distribution	83	5.7
Hazard of occupancy too severe for average sprinkler equipment	86	5.9
Explosion crippled sprinkler equipment	64	4.4
Exposure or conflagration	72	4.9
Plugged heads	11	0.7
Miscellaneous	107	7.3
Total	1461	100.

The foregoing table clearly indicates that the number of sprinkler failures could be cut in two if it were not for water being shut off the equipment and generally defective equipments including unsprinklered sections.

Closed Valves

Considering first the matter of water being shut off the sprinkler system, we see that approximately thirty per cent. of all sprinkler failures are due to this one cause. No single factor so much contributes to the impairment of general sprinkler efficiency as this carelessness in regard to closed valves. In considering that 30% of sprinkler failures were due to this cause we have to remember

*Heads with solder that melts at temperatures higher than 155 degrees (See pages 16 and 17).

that these are only the closed valves which were found to be closed through the occurrence of fire. Hundreds, and we venture to say thousands, of valves controlling water supplies are found closed each year by insurance inspectors. The insurance interests are keenly alive to this situation and have instituted rigorous inspections to guard against this danger, but, such is the nature of human carelessness, that none of these inspection plans has as yet brought the results which are needed, as is clearly shown by the reports issued covering such inspections.

Too great emphasis cannot be laid on the necessity for the most rigid inspection of all valves on your sprinkler system by some responsible party. It is not a heavy task to have the valves on a system looked over each day and such super-carefulness is warranted. Of course in some cases it is absolutely necessary to close

FIG. 1.
INDICATOR POST WITH
SUPERVISORY GATE VALVE BOX—"C"

FIG. 2.
GATE VALVE WITH SUPERVISORY
GATE VALVE BOX—"B"

valves in order to have certain repairs or changes made in the system. Wherever such necessity arises we believe that the importance of the matter warrants the placing of a man directly at the closed valve where he, or his relief, should stay until the valve is open and the system again restored to service. In case valves are to be closed you should notify your insurance bureau to that effect.

The most successful method we know of guarding against closed valves, whether caused by carelessness or by malicious intent, is by means of SUPERVISORY SERVICE. The Indicator Post and Gate Valve Supervisory Devices are described on the following page.

Supervisory Service is an automatic check against human carelessness and as an indication of the prevalence of such carelessness we would call attention to the reports of the American District Telegraph Company, which operates this service, showing that in one large city in a single year six hundred and sixty-six valves out of a total of twenty-seven hundred and seventy-seven valves supervised were temporarily closed at one time or another during the year.

The accompanying pictures, Figure 1 and Figure 2, illustrating Indicator Posts and Gate Valves with Supervisory Devices "B" & "C" attached, show how supervisory automatically gives notification of the closing of any valves. Each of these gate valve boxes contains an electric switch attachment so arranged that upon the first movement to close a valve the electric switch is mechanically operated, breaking the circuit which in turn operates a supervisory transmitter and flashes the warning to the central office. There are several types of these gate valve boxes, each particularly adapted to some type of valve in common use.

In Figure 2 is shown the attachment for an O. S. & Y. valve. In this case a roller resting in the stem of the gate valve is moved out of a notch the instant the valve starts to close and the roller transmits the mechanical motion to the electric switch enclosed in the box B shown in the photograph.

Of course, the supervisory wires connecting these various gate valve boxes with the signal transmitters are enclosed in suitable steel conduits. The several gate valves in the building are also connected with each other in a given section of the building so that they can be quickly located as the central office code number identifies the particular section which is in trouble. Similar devices all sending automatic and immediate signals to a central station can be installed on pressure tanks, gravity tanks, fire pumps and on all alarm and dry-pipe valves for transmission of fire alarms. All of these devices are fitted with "tamper switches" which instantly give an alarm if an attempt is made to remove the covers. This apparatus is designed to be fool proof to a high degree.

Old or Incomplete Equipment and Unsprinklered Sections

Unsatisfactory performance of sprinkler equipment can be guarded against by seeing to it that the installation standards of the present day are adhered to. These standards are the result of extended engineering research and careful analysis of field data on the part of manufacturing and insurance experts, this data covering widely varying service conditions and extending over a period of more than forty-five years.

Systems which were installed before present day experience had been accumulated and before the standards which now prevail were adopted may not have a proper spacing of the sprinkler heads; in other cases the size of piping is not right, or the valves and heads are obsolete.

If you have in your property an old system, changes in occupancy which so generally are found necessary may have altered the original layout, while other factors may have so entered as to seriously impair the efficient operation of the equipment.

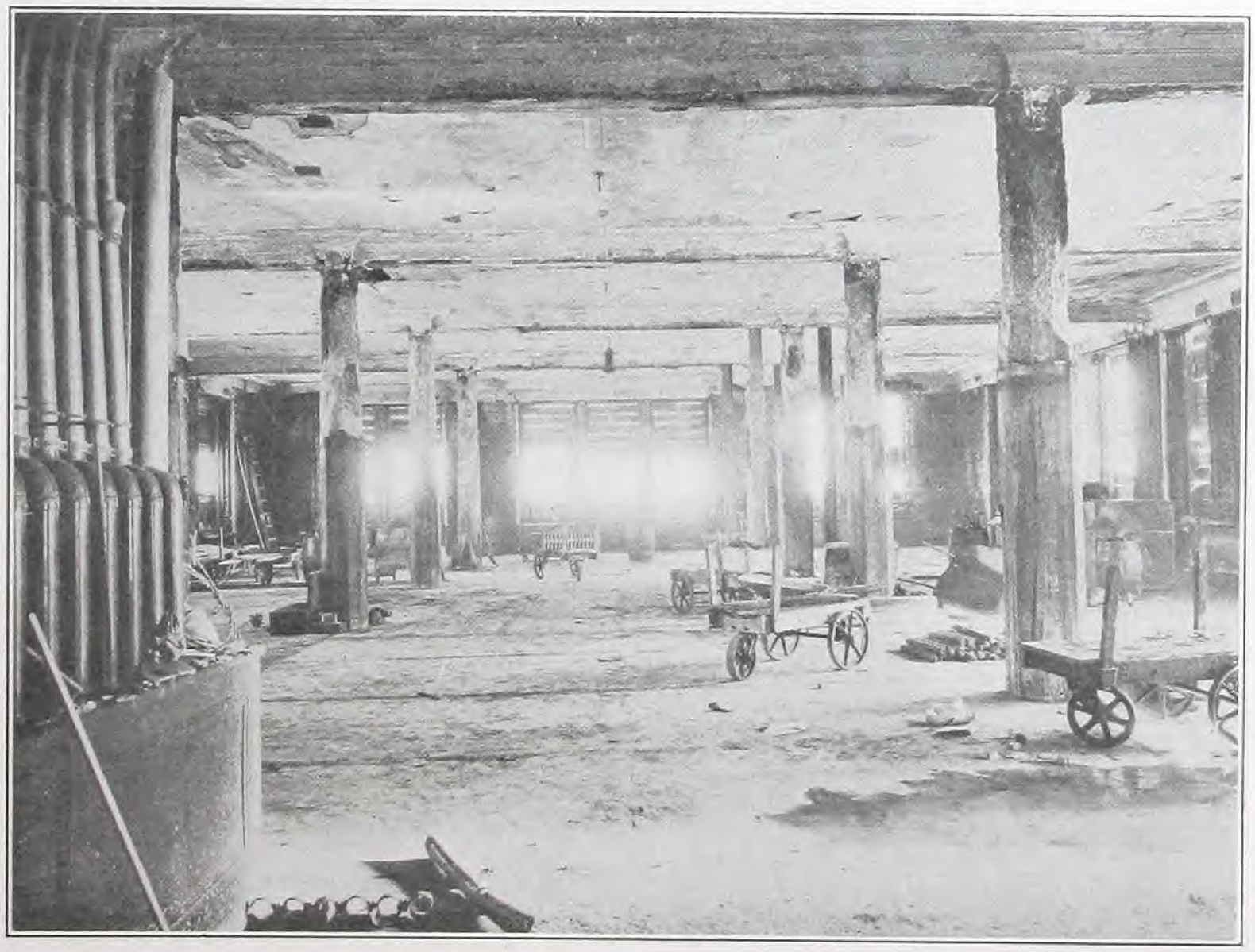
Loss in efficiency may result from many causes and we urge that occasionally a careful survey be made of the entire system with the thought of correcting improper spacing, rearranging, replacing, or extending piping in conformity with the present day sizes, checking the condition of the sprinkler heads, putting in new ones where

THE WATER SUPPLY TO HALF THE SPRINKLER SYSTEM IN THIS BUILDING WAS TURNED OFF. SPRINKLERS DID MORE THAN SHOULD BE EXPECTED OF THEM IN PREVENTING THE DESTRUCTION OF THE WHOLE PLANT

they may be found corroded or otherwise damaged, and generally bringing up to date the different parts which, as a result of continued service, have deteriorated to the point of impairment to the service which should normally be expected.

We are in position to furnish experienced engineers to look over your property with you, and we urge you to occasionally take advantage of this opportunity of getting advice which will work toward the betterment of the equipment and its maintenance in a high state of efficiency.

THE EMERSON BRANTINGHAM CO. DID NOT CARRY THEIR USUAL SPRINKLER PROTECTION INTO THEIR "FIRE PROOF" OFFICE BUILDING.



THE PRICE PAID BY THE EMERSON BRANTINGHAM CO. FOR DEPENDING ON FIRE RESISTIVE CONSTRUCTION RATHER THAN ON THE FIRE FIGHTING ACTIVITY OF AUTOMATIC SPRINKLERS.

Unsprinklered sections in otherwise sprinklered risks are usually the result of people trying to accomplish the impossible, namely, to pick out that portion of their plant where they think a fire is apt to occur and sprinkler that portion but leave unprotected those portions where they think the danger is slight. Unsprinklered sections to all practical intents and purposes often result in what amounts to an exposure fire, in that the blaze grows to such proportions that when it reaches a sprinkler system it overwhelms the equipment.

No man can tell where a fire will start, any more than he can tell when it will start, and if you have unsprinklered sections in your plant we strongly urge you to consider carrying automatic sprinkler protection to these sections, as any unsprinklered section is a danger point as compared to the rest of a sprinklered plant, even though its inherent hazards are less.

ANOTHER VIEW OF THE EMERSON BRANTINGHAM OFFICE BUILDING FIRE

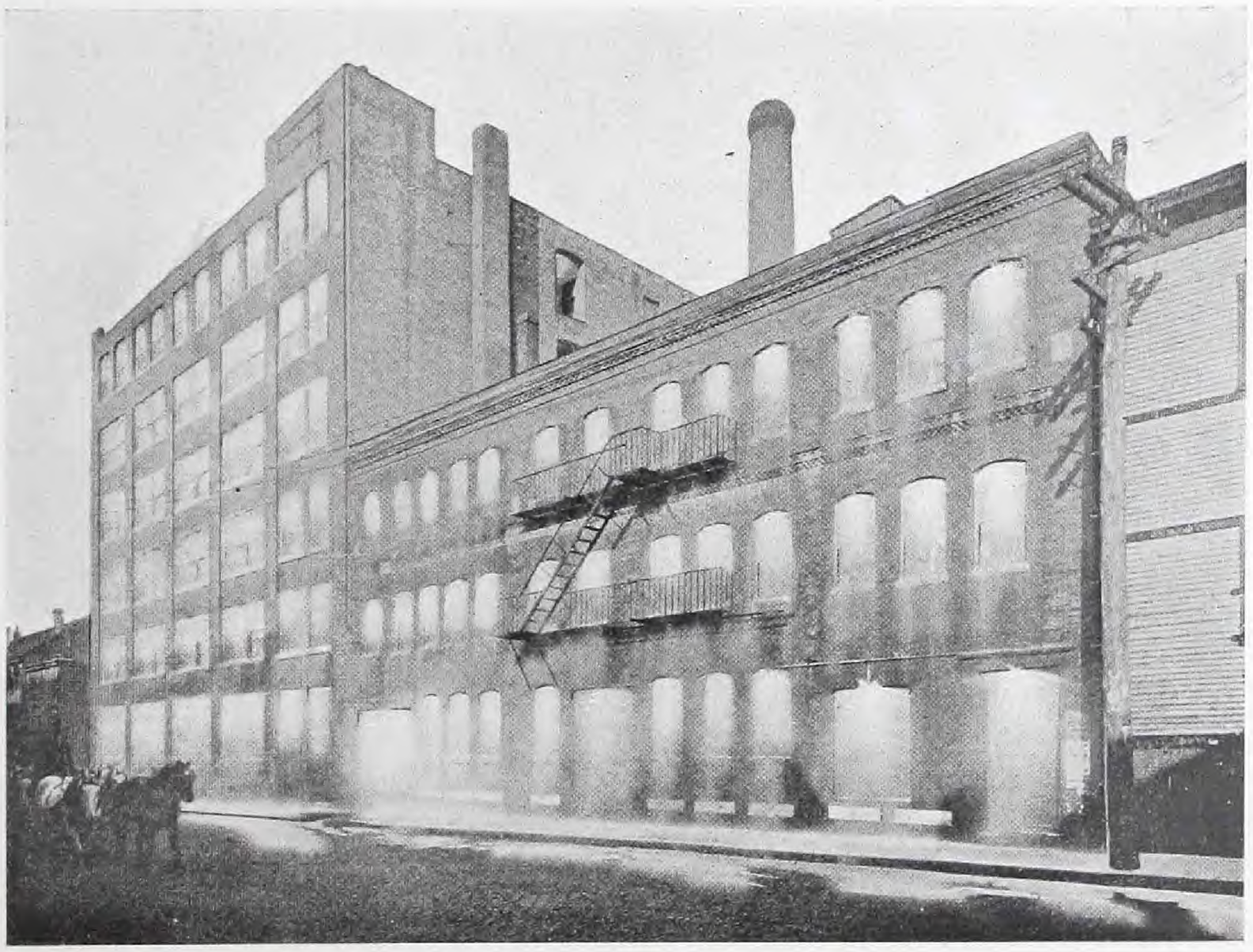
Defective Supplies

The material which accompanies the later discussion of the matter of water supplies will, of course, be used by you in determining whether you consider the supplies in your risk entirely satisfactory. In general we would say, however, as far as water supplies are con-

cerned, that high pressure rather than large volume should be sought, although of course a sufficient volume is absolutely necessary. You should, to have your equipment in the very best shape, maintain a pressure of not less than fifteen pounds on the top line of sprinklers and if the pressure in your risk falls below this we suggest that you communicate with our nearest office in order that we may advise with you to see whether some means cannot be taken to better this condition.

Exposure or Conflagration

While the ordinary sprinkler system is not intended to be an absolute safeguard against heavy exposure fires, equipments have



Open Sprinkler System of Gillette Safety Razor Company In Operation. This Protection Once Saved This Property From a Serious Exposure Fire

so often stopped conflagrations that people generally have grown to depend on them to a greater or less extent to perform this function. Except in the case of systems having unusual water supply, both as to pressure and volume, such satisfactory performance in exposure fires should not be expected. If your property is seriously exposed by unsprinklered buildings of any kind we urge you to consider the installation of open sprinklers and use your influence

to get your neighbors to adopt the same measures of fire protection that you have. Do not risk your going business on the chance that your interior sprinkler system will be able to cope successfully with a heavy exposure fire.

Obstruction to Distribution

Obstruction to distribution accounts for approximately 5¾% of all so-called sprinkler failures. Do not let your desire for great production and a consequent speeding up throughout your plant, blind you to the danger of losing all you have by storing stock too

GRINNELL OPEN SPRINKLERS ON THE O'NEILL STORE HELPED STOP THE BALTIMORE FIRE.
DON'T DEPEND ON YOUR INTERIOR EQUIPMENT TO PERFORM ANY SUCH
REMARKABLE FEAT. INSTALL OPEN SPRINKLERS

close to sprinkler lines, or putting up shelving, bins, etc., which interfere with the distribution from any sprinkler head. Just remember that to be really efficient the sprinkler must catch the fire when it is only a small blaze. If you store your goods, or change the interior of your plant, so that fire can gain great headway before the water from a sprinkler can reach it, you have defeated the purpose and the idea of this type of protection. In addition to merchandise often being packed so closely around sprinklers that water

distribution is interfered with, we have found in numerous cases that articles of merchandise have been suspended from the sprinkler piping and this, of course, especially where these loads have been heavy, has seriously deranged such piping. In no case should anything whatever be suspended either from the sprinkler heads or the sprinkler pipes.

Another feature which comes under this same general heading is the proper guarding of sprinkler heads where there is a possibility of their being struck by moving stock. Where there is such a possibility, approved sprinkler head guards (see page 16) can be procured at a small cost and these are a sure safeguard against any ordinary blow injuring the sprinkler heads.

Faulty Building Construction, Concealed Spaces, etc.

While matters of building construction, especially those having to do with concealed spaces and vertical openings, are not really features of a sprinkler system, we wish to briefly mention them, because in a great many cases it is easy, at comparatively small expense, to remedy these handicaps to successful sprinkler operation.

In some cases faults of building construction, such as large vertical openings, open stairways, etc., cannot of themselves be remedied on account of business operations which depend on their being just as they are. It is possible in cases like this, however, to especially adapt the sprinkler system to the conditions which must be met. For instance, in flour mills we have found that certain fire dangers due to building construction can be minimized by the installation of enough extra heads to thoroughly check the fire which might otherwise spread and consume the whole plant. This is a matter primarily for sprinkler engineers to work out and if your inspection of your property leads you to believe that you have any serious hazards of this nature, we would be very glad to advise with you concerning a possible change in the system to take care of the situation.

Hazardous Occupancies and Explosions

In the tables of "unsatisfactory" sprinklered fires earlier given there were eighty-six fires classified as unsatisfactory because the hazard of occupancy was too severe for the ordinary sprinkler system. Considering the fact that automatic sprinklers are protecting the most hazardous industries, it is truly remarkable that so few fires come in that class, because the eighty-six fires referred to amount to only one-quarter of one per cent of all sprinklered fires, which shows that in only exceedingly rare instances is an occupancy too severe a hazard for automatic sprinklers to safeguard, providing they are kept in thoroughly operative condition and have back of them sufficient water supplies.

A study of the details of these fires shows that a considerable proportion of them might really have been classified under other

heads, usually obstruction to distribution or faulty building construction. Almost all sprinkler system owners are happily free from a consideration of this extra hazardous occupancy question, because a study of the records shows that most of the fires classed under that heading occurred in a very few classes of risk. But to those who have an extraordinary fire hazard we urge a thorough consideration of isolating such hazards by means of fireproof rooms, fire walls, or at least by automatic self-closing fire doors. Where inflammable liquids are in use in open tanks, special fire extinguishing apparatus as Grinnell Automatic Foam Tanks should be installed.

As regards the matter of explosions, the records show that sprinkler failures from this cause have been less than two-tenths of one per cent of all sprinklered fires, so that this danger is really very slight in the ordinary risk, although by its very nature such an occurrence is apt to result in extremely severe losses.

Sprinkler Systems can hardly be expected to control fires caused by explosions on account of the fact that the piping is often destroyed by the first shock. Plant superintendents are, however, usually alive to such dangers and always know what sections of their plant are exposed to the consequences of an explosion. In many cases, therefore, the results of an explosion can be localized and minimized by properly enclosing the danger spots with exceptionally rugged construction or by the removal of dangerous processes to detached buildings.

In General

Upkeep of a sprinkler equipment involves attention to many varying factors depending on the nature of the occupancies which are involved. Although upkeep problems may not appear in a review of the foregoing unsatisfactory fire table, they are none the less real and should be given careful study by the individual owner.

The most important part of the whole equipment is the sprinkler head, and the following will indicate the most important points which should be given consideration if the heads are to be maintained in good operative condition and upkeep troubles are to be avoided.

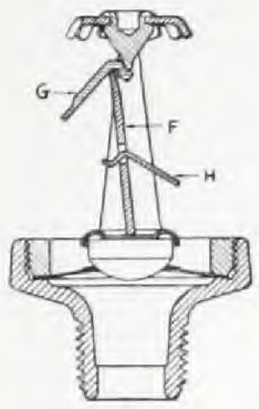
Corrosion

In many classes of risks, corrosion is a factor to which very special attention must be given. If this feature is lost sight of, an otherwise satisfactory equipment may give trouble, or if called on for service, may be found sluggish in action or even wholly inoperative.

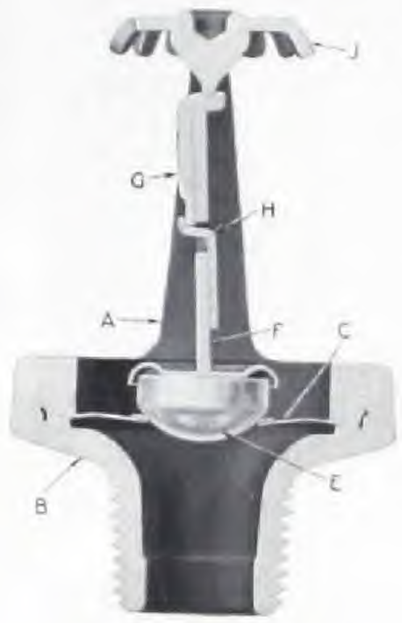
Up to within four years all automatic sprinklers have been of the "solder type," that is the releasing mechanism has been held together with special fusible alloys. The Grinnell Solder Type Sprinkler was the pioneer head in this field and today, as during the past forty-five

years, it stands in the forefront and represents the highest development of this type of head. Although under ordinary conditions heads of the solder strut type will last an indefinite period, corrosive influence may so change the fusible alloy that the head will be slow in operating; in time the action may entirely destroy its value.

With the view of eliminating this inherent disadvantage of solder sprinklers and at the same time to effect other improvements, the Grinnell Company put on the market in 1923 the Grinnell Silica Bulb Sprinkler, now known as the Grinnell Quartz Bulb Sprinkler. In this head an entirely new principle of operation is used, solder is entirely discarded, and in its place a quartz bulb partially filled with special liquid is utilized.

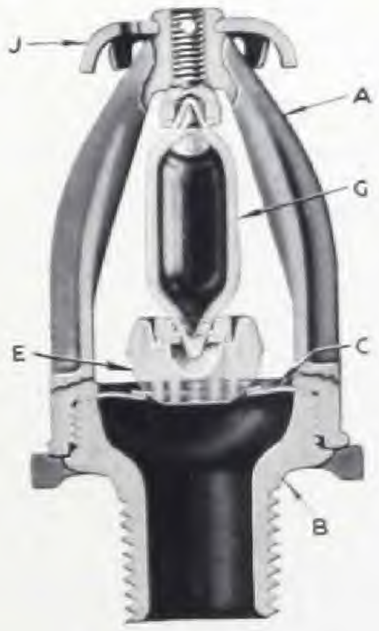


SOLDER TYPE
SPRINKLER HEAD



A—Yoke C—Diaphragm F—Main Strut Piece H—Key on Strut
B—Body E—Glass Disc G—Hook on Strut J—Deflector

QUARTZ BULB
SPRINKLER HEAD



A—Yoke C—Diaphragm G—Quartz Bulb
B—Body E—Glass Disc J—Deflector

From comparison of the cuts above it will be seen that there is a similarity between the Quartz Bulb and the Solder Type heads, the principal difference being that the quartz bulb G takes the place of the elements F-G-H which form the strut of the latter.

Fused silica or quartz is not attacked by any of the troublesome corrosive agents; hence it is apparent that the element of uncertainty

as to the reliable condition of the sprinkler, after being in service for a period of years, is eliminated. The operating element at all times is at its maximum state of efficiency. Under severe conditions the metal parts of the bulb head, of course, need protection, and a coating such as lead and similar materials can be applied in addition to waxes as used heretofore on solder heads.

In case you have the Solder Type heads in your equipment and have any reason to believe your service conditions have been or are of a corrosive nature, we earnestly recommend that you remove a

Grinnell Automatic Sprinkler Head, Solder Type with Special Wire Guard

This Head tight after Heavy Blow, but It Should Have Had a Guard

Grinnell Automatic Sprinkler Head, Quartz Bulb with Special Wire Guard

few samples, which appear representative, and forward them to us at our Providence Plant. We will gladly give them a thorough inspection and laboratory test and forward a report covering our findings. In cases where heads show deterioration our department managers will be glad to offer liberal terms on heads returned for replacement with new ones.

Overheating

Both forms of head are designed to take care of the same ranges of room temperature and may be used interchangeably. It is important that these temperature ranges be adhered to. Failure to do so is the most frequent cause for trouble experienced on the part of owners. These devices are made to careful standards and subjected to the most rigid factory tests for accuracy of release when a certain temperature is reached. Consequently when sprinklers open without any apparent cause, excess room temperatures resulting from exposure to steam pipes, hot air ducts, furnaces, etc., may be looked for.

Experience has shown that in the case of the Solder Type heads it is proper practice to allow a margin of approximately 60 degrees between the operating point of the sprinkler and the maximum

temperature of the air in the section of the room where the head is located. Due to difference in operative characteristics of the Quartz Bulb head, it was found safe to reduce this range to about 30 degrees. Consequently, as shown by the following table, the marking on the two types varies.

Head Rating		Frame	Service Temperature Range
Solder Type	Quartz Bulb	Color	at the Sprinkler Head Level
155°	135°	Uncolored	Not to exceed 100°F
212°	175°	White	100°-150°
286°	250°	Blue	150°-225°
360°	325°	Red	225°-300°

The liquid in the bulbs of 135° Quartz Bulb heads is amber in color; that in the 175°, 250°, and 325° bulbs is red.

Carefully select the proper rating head and note:—

(1) That the temperature at the sprinkler is generally higher than at the floor level. If in doubt, check your conditions.

(2) That sprinklers installed in skylights and where subjected to direct rays of the sun should be of the 212° Solder Type or 175° Quartz Bulb rating.

(3) That due regard is given to drying ovens, forges, steam lines, etc., particularly when making changes in your property.

(4) Although desirable to have heads of sufficiently high rating to cope with service ranges, guard against the undue use of high rating heads and if removing sources of high temperature, replace high rating heads with lower.

Freezing

When sprinklers are installed on wet-pipe systems, suitable precaution must be taken in freezing weather as serious damage may result not only to the sprinklers, but also to the pipe lines. Special care should be taken to see that no windows, transoms, elevator shafts, doorways, or other openings, such as frequently are found in shipping and receiving rooms and the plant proper, are left open thus exposing the equipment to freezing temperatures.

Fires are often banked over night and during non-working days in an effort to save coal. If this practice is followed, it is extremely important to see that no sections of a property, in which a wet-pipe equipment is installed, are allowed to fall below a temperature of 40°F.

Painting

It is frequently found, on making a general inspection of a risk, that the sprinkler heads have been entirely painted over, which, of course, makes them slow to operate. This is a factor of great importance where Solder Type heads are involved, and should be

avoided in case of the Quartz Bulb head in order to insure maximum sensitiveness.

The ordinary painter can hardly be expected to know much about a sprinkler equipment or realize the importance of it to the owner of a going business, and painters should be instructed never to paint the fusible member of a sprinkler head. We suggest the wisdom of having some competent man make periodic inspections of your equipment in order to determine the general condition of the heads.

Corrosion and its Prevention

In some types of risks such as bleacheries, plating establishments, salt works and chemical works, corrosion of piping and the equipment in general is a factor which must be considered. The treatment which can be recommended must be suited to the conditions which prevail in the particular case. If you have upkeep problems which are giving you trouble, our engineers will be glad to assist you by suggesting improved methods of protection.

Repair Work and Extensions

At times we find owners who appear to give little consideration to maintenance. If the system is to operate as it normally should and "put the fire out when it starts" any attempt to economize by putting off repair and maintenance work is surely a false move. See to it, that if hangers are broken new ones are installed in their place; that no one in your property hangs material on the lines or uses them in a way to impose undue stresses on them; that if plant changes are made and one or more heads need to be added to adequately cover some sections, the work is not put off. Delay may be a serious matter. Don't allow your equipment to be abused or neglected.

We suggest you make an allowance in your budget each year which will allow for work of this character. Sprinkler apparatus is being improved and made more efficient, and in order to insure having best results obtainable the most modern forms of equipment should be added or substituted for the obsolete or older forms. Such work may have little effect on your insurance rating, but can be made of tremendous advantage from the standpoint of efficiency of your equipment. Let us work with you when extensions or repairs are contemplated in order that results may be obtained in the most economical way.

Notes

Information regarding repairs to Alarm Valves, Dry-Pipe Valves, Accelerators, Alarms, etc., is given on the pages illustrating and describing these Fire Protection Specialties, also on pages 43 and 84 to 86.

See page 93 for information on Sprinkler Cabinets.

Various Types of Systems

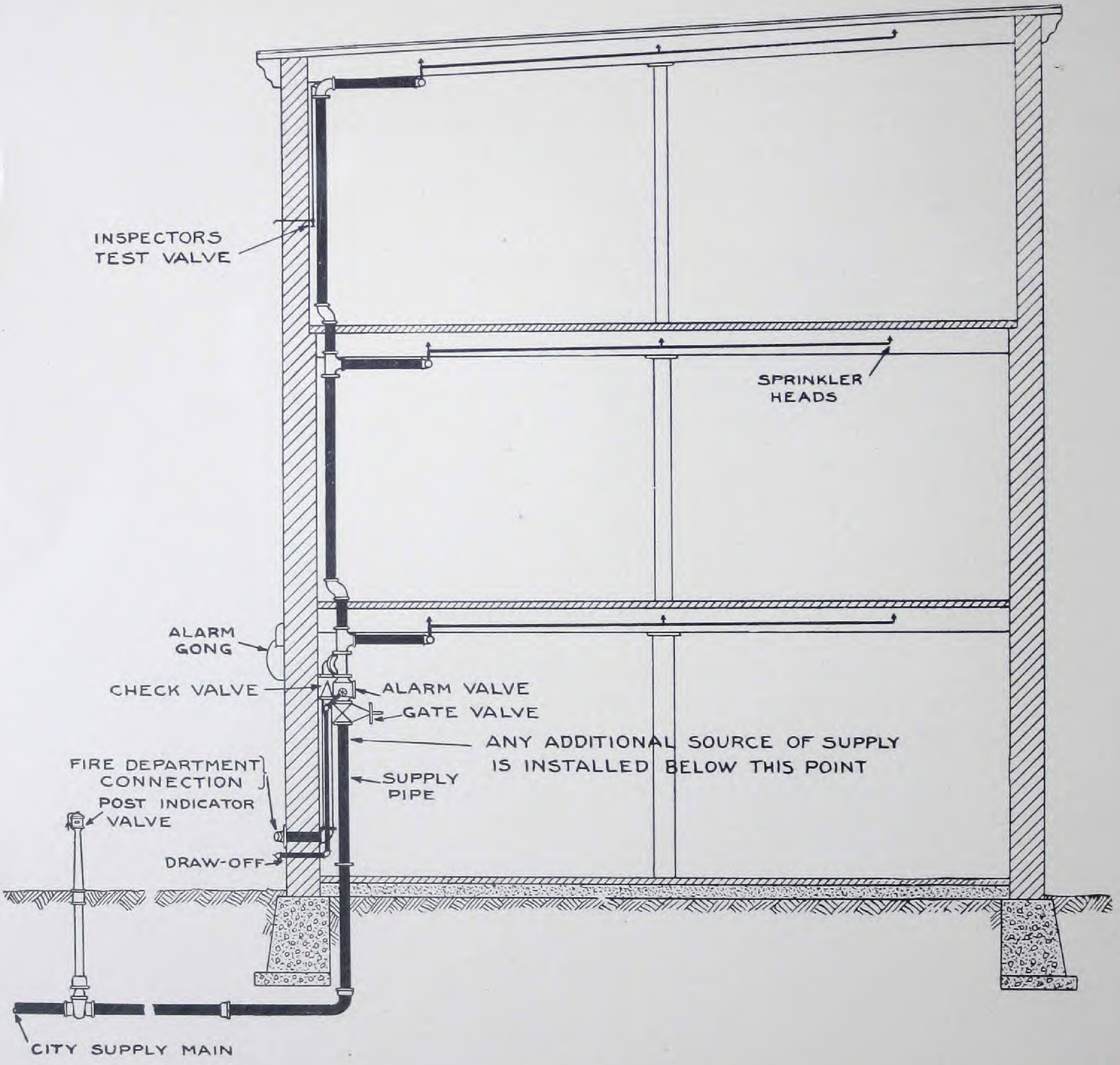
On the following ten pages are shown drawings illustrative of buildings equipped with automatic sprinklers having different water supplies. Readers can quickly find those pages applying to their particular risks by consulting the following index.

Special Notice

No matter what type of system you have, refer to Drawing 1 and accompanying description (pages 20-21) for instructions on shutting off water supplies in case of accident or after a fire has been extinguished.

Such instructions are not repeated in other drawings. They are important. Familiarize yourself with them so that you can act quickly in any emergency.

City Water Supply



DRAWING 1—CROSS SECTIONAL VIEW OF BUILDING EQUIPPED WITH AUTOMATIC SPRINKLERS CONNECTED TO CITY WATER SUPPLY MAIN

City Water Supply

The drawing opposite shows the simplest and most common water supply to Automatic Sprinkler Systems.

In buildings having this city water supply the utmost care should be exercised in seeing that the post indicator valve, placed as shown in the main water supply pipe to the sprinkler system, is always sealed open. For instructions on Post Indicator Valve, Alarm Valves, Alarm Gong, and Fire Department Connection, see pages listed in Index at right.

The glass windows at top of the Post Indicator Valve will show the word OPEN when the valve is properly set to allow a maximum amount of water to flow into the system from the city main. Look at the Post Indicator Valves about your building. If any of them show CLOSED it means that the water is shut off your sprinkler system and that the sprinklers can not therefore possibly be expected to put out a fire if this is the only source of supply you have.

If any of the glass windows in Post Indicator are missing or cracked, repairs should immediately be made, as water may get into the post, freeze and crack the casing.

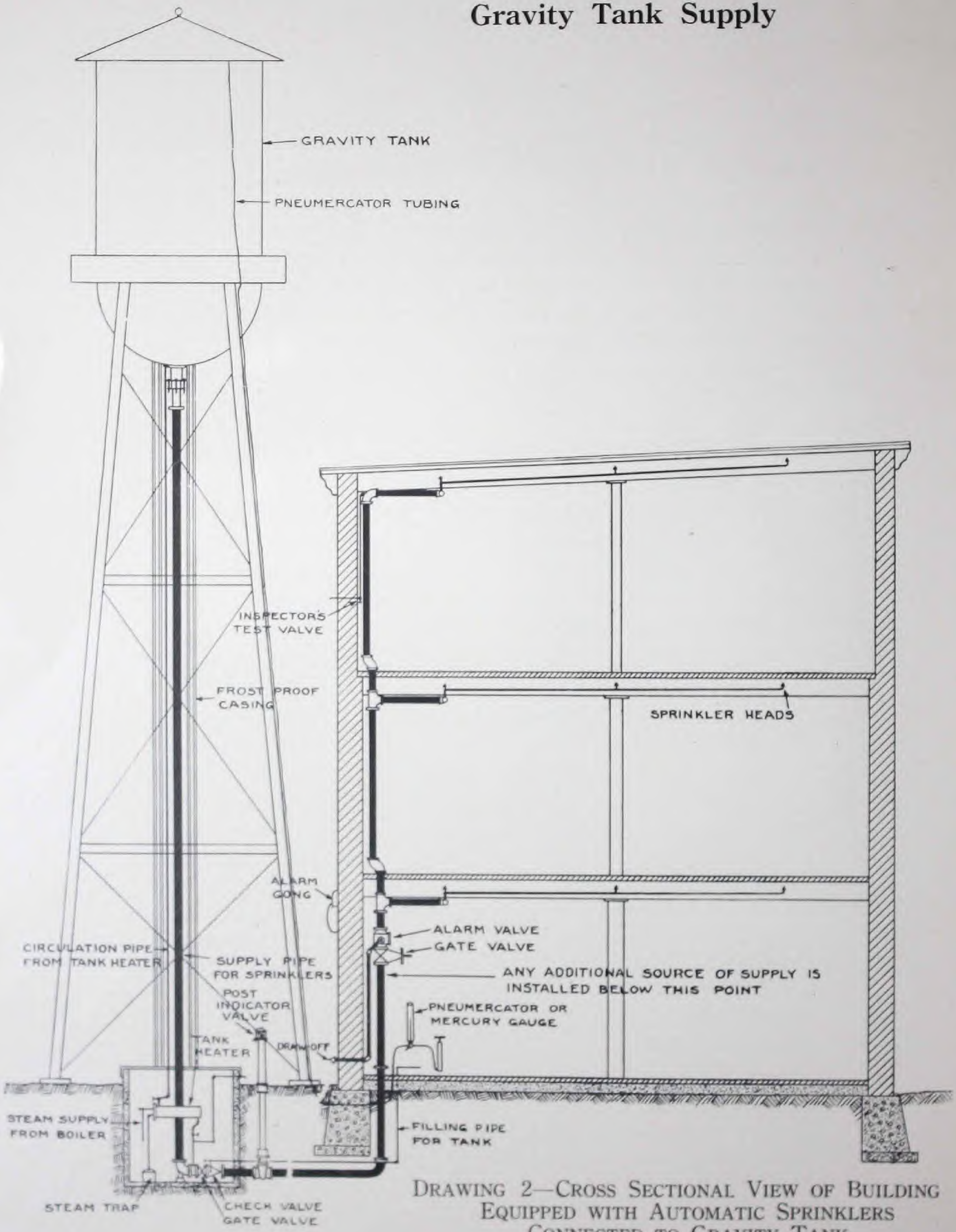
After you have made this complete inspection and all Post Indicator Valves show OPEN, see that they are sealed in that position. If you are not provided with proper seals take the matter up with your insurance company.

In case of any accident happening to the system the Gate Valve shown just below the Alarm Valve (but which may be at any point in the building below the alarm valve) should be immediately closed and the Draw-Off Valve opened, so as to draw off the water from the system as quickly as possible. The same thing applies in case of fire, but, of course, this Gate Valve should not be closed until some responsible person has so authorized, after being sure that the fire is completely extinguished. As soon as the system is again in order the draw-off should be closed and the Gate Valve opened, so as to put the system again in operative condition with ample water supply.

The Insurance Inspectors' Test Connection shown at the left top corner of the drawing is installed solely for the use of the accredited inspectors of the Underwriters having jurisdiction over your risk.

Index to Detailed Description of Devices Mentioned On This and the Preceding Page

Gravity Tank Supply



DRAWING 2—CROSS SECTIONAL VIEW OF BUILDING EQUIPPED WITH AUTOMATIC SPRINKLERS CONNECTED TO GRAVITY TANK

Gravity Tank Supply

The drawing opposite shows in detail a sprinkler system with gravity tank as a source of supply. General precautions covering system connected to city water were given under Drawing 1 and if you have, in addition to a gravity tank supply, a connection to city water, refer back to Drawing 1 as well as to drawing opposite.

For instructions on Alarm Valves, Alarm Gong, Post Indicator Valve, Tank Heater, Pneumercator, Mercury Gauge, see pages listed in Index at right.

Special precautions are necessary in winter to see that the gravity tank does not freeze. Provisions for adequately warming the water in the gravity tank and the riser leading from it to the underground valve pit, or to the top story of building when the tank is above the roof, are usually made by the installation of a tank heater which is described in detail under the heading—"Tank Heater." (See pages listed in Index at right.)

While this drawing shows a tank heater supplied by steam, there are, of course, other types. Special precautions should be taken to see that tank heaters of whatever sort are started up before freezing weather sets in, so that it will not be necessary to heat a large body of water at freezing temperature. The temperature of the water is indicated by a thermometer installed in connection with the tank heater and the temperature of the water should never be allowed to fall below forty degrees.

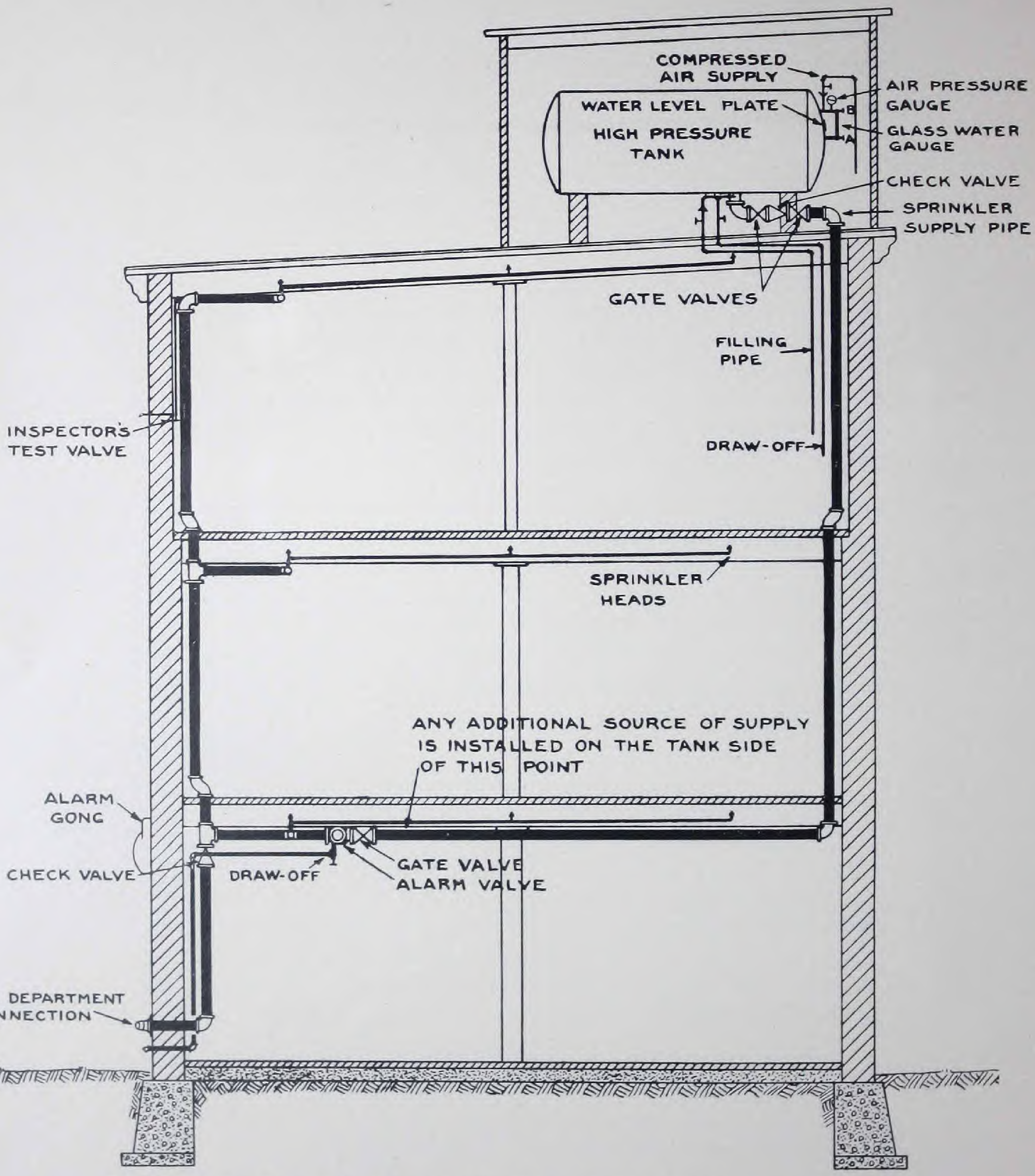
Index to Detailed Description of Devices Mentioned On This and the Preceding Page

Water Level in Gravity Tank

It is, of course, absolutely essential that the utmost care be taken to see that the water in the gravity tank is always at full water level. This can be determined either by a tell-tale on the outside of a tank, by a mercury tank gauge or the pneumercator, which this company is prepared to install on any system having gravity tank supply. (For detailed description see pages listed in Index at right.)

The frost proof casing shown about the riser leading from the gravity tank is to confine the heat from the tank heater and help prevent the freezing of water in the tank riser. Care should be taken to see that it is intact. The filling pipe shown is, of course, used to provide water for the gravity tank and supply for the same is taken either from city water where pressure is sufficient or from a tank filling pump.

Pressure Tank Supply



DRAWING 3—CROSS SECTIONAL VIEW OF BUILDING EQUIPPED WITH AUTOMATIC SPRINKLERS CONNECTED TO PRESSURE TANK.

Pressure Tank Supply

(For instructions on Alarm Valve and Alarm Gong, etc., see Drawing 1 and Page 21, also pages listed in Index at right.)

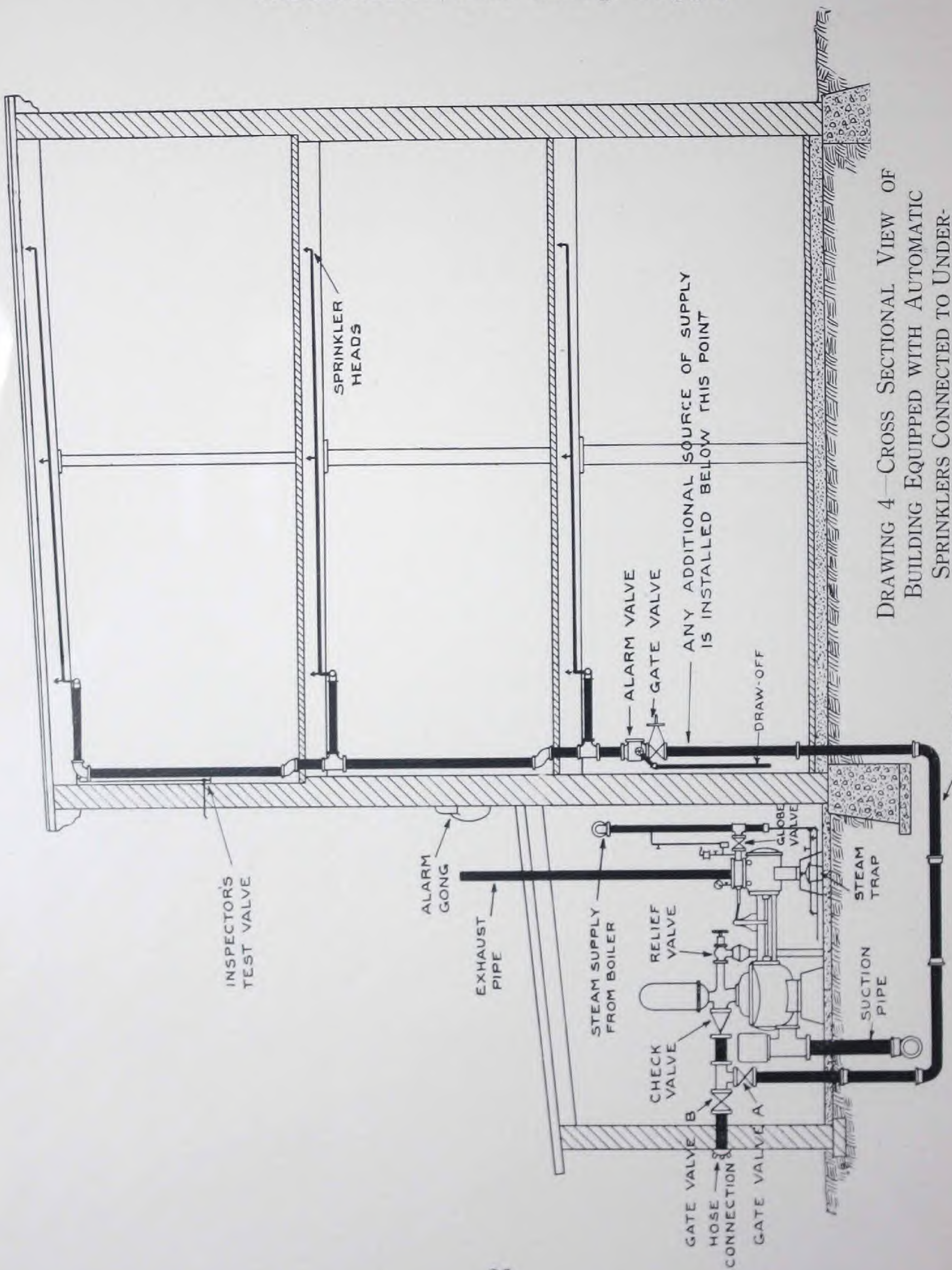
Records prove that the Pressure Tank is one of the most dependable and satisfactory of all sprinkler supplies and its maintenance is extremely simple. The tank should always be kept about two-thirds full of water, as indicated on the water level plate on the front of the tank. The other third of the tank is constantly filled with compressed air supplied from an Air Compressor.

To ascertain the amount of water in the pressure tank, open valves at the top and bottom of the glass water gauge. It is imperative, however, that these Water Gauge Valves be closed immediately after the water level is found. If these valves are left open and the glass is broken, air and water will escape.

It is especially important with a pressure tank to see that the water is kept under Proper Pressure at all times and this requires frequent inspection if accidental air leaks are to be guarded against. The proper air pressure which should be kept on the tank is indicated on the water level plate on the front of the tank. The filling line shown is for the purpose of filling the tank to the proper level and the supply for filling is from city water supply when of sufficient pressure, which in the average equipment must be more than seventy-five pounds, or from a tank filling pump.

The Pressure Tank House must be kept warm at all times, so that there will be no danger of freezing of the Tank or any of the piping connections.

Underwriter Fire Pump Supply



DRAWING 4—CROSS SECTIONAL VIEW OF BUILDING EQUIPPED WITH AUTOMATIC SPRINKLERS CONNECTED TO UNDERWRITER FIRE PUMP.

Underwriter Fire Pump Supply

The drawing above shows in detail a sprinkler installation supplied by an Underwriter Steam Fire Pump. There are several other types of pumps installed with sprinkler systems and the Underwriters have published descriptions of the various types which may be had by applying to the Insurance Company having jurisdiction.

Some hints on the maintenance of Fire Pumps are given on the pages listed in Index at right.

The primary requisite with such a steam fire pump supply is that an ample supply of steam be always available to operate the pump at its maximum capacity. Steam is held back of a point where it would operate the pump by a globe throttle valve shown on the drawing. In this connection extreme care should be used to see that the steam trap is always in perfect working order, so that no condensation may collect in the steam supply pipe. Such condensation, on the opening of the throttle valve, might wreck the pump, thus putting the system out of commission. See description of Grinnell Steam Trap on page listed in Index at right.

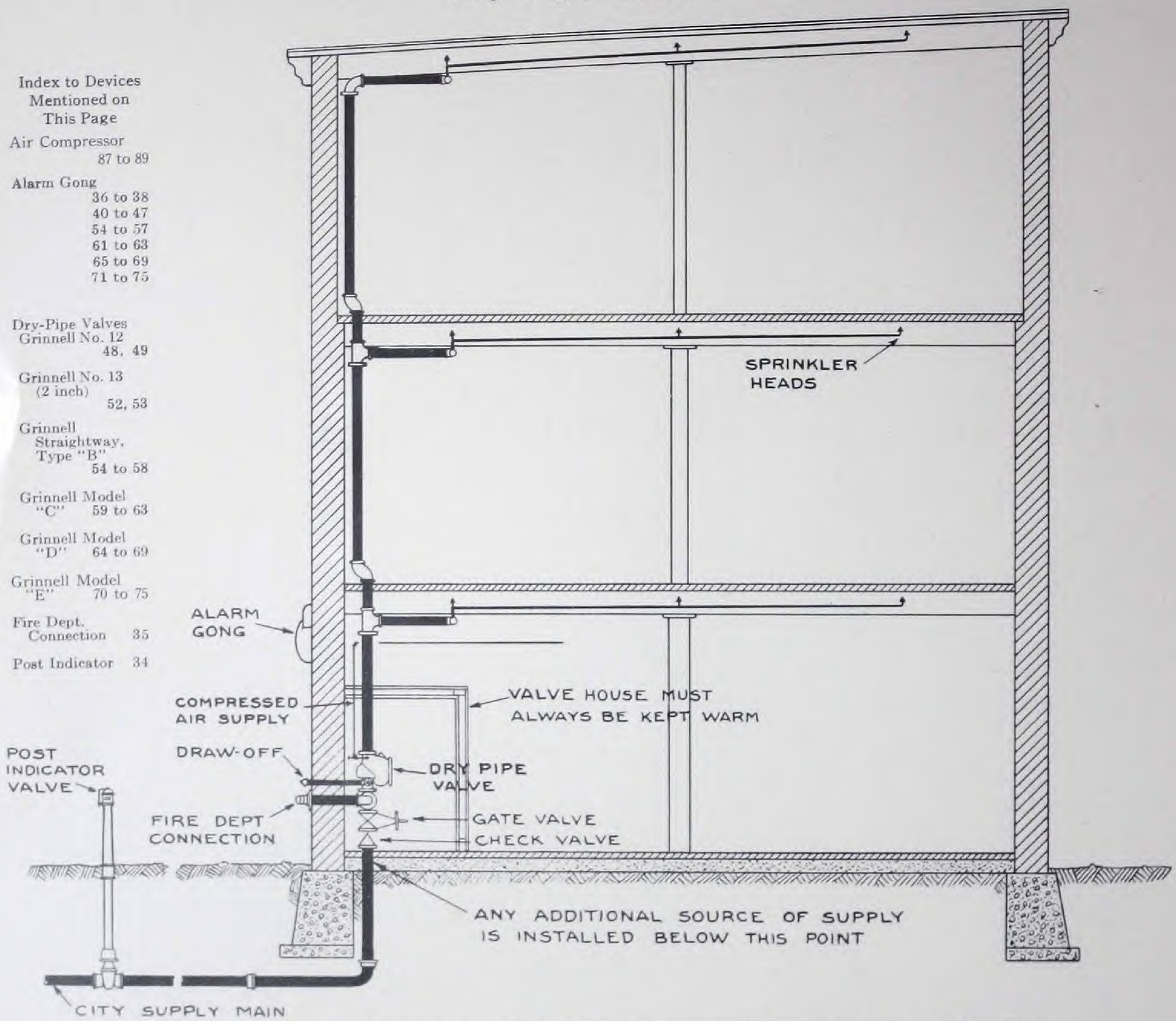
The Gate Valve "A" should always be open, as that controls the pump supply to the sprinkler system.

The Gate Valve "B" which leads to the three-way hose connection located on the outside of the pump house, should always be kept closed until emergency demands its opening.

The suction pipe shown leads to a reservoir, cistern, river or other sufficient supply. At the base of this suction pipe is installed a strainer or screen, which should be inspected frequently to see that it is free from debris, which might possibly prevent its taking proper suction.

Index to Detailed Description of Devices Mentioned On This and the Preceding Page

Dry-Pipe System



DRAWING 5—CROSS SECTIONAL VIEW OF BUILDING EQUIPPED WITH DRY-PIPE SYSTEM OF AUTOMATIC SPRINKLERS

The drawing above shows a dry-pipe system of automatic sprinklers supplied by city water only but such a system can be supplied by any one or any combination of the supplies shown in Drawings 2, 3 and 4. It is our judgment that a dry-pipe system should be maintained dry-pipe the year round because—

1—Filling it with water in warm weather is liable to wash foreign material into the system which can never be properly drawn off.

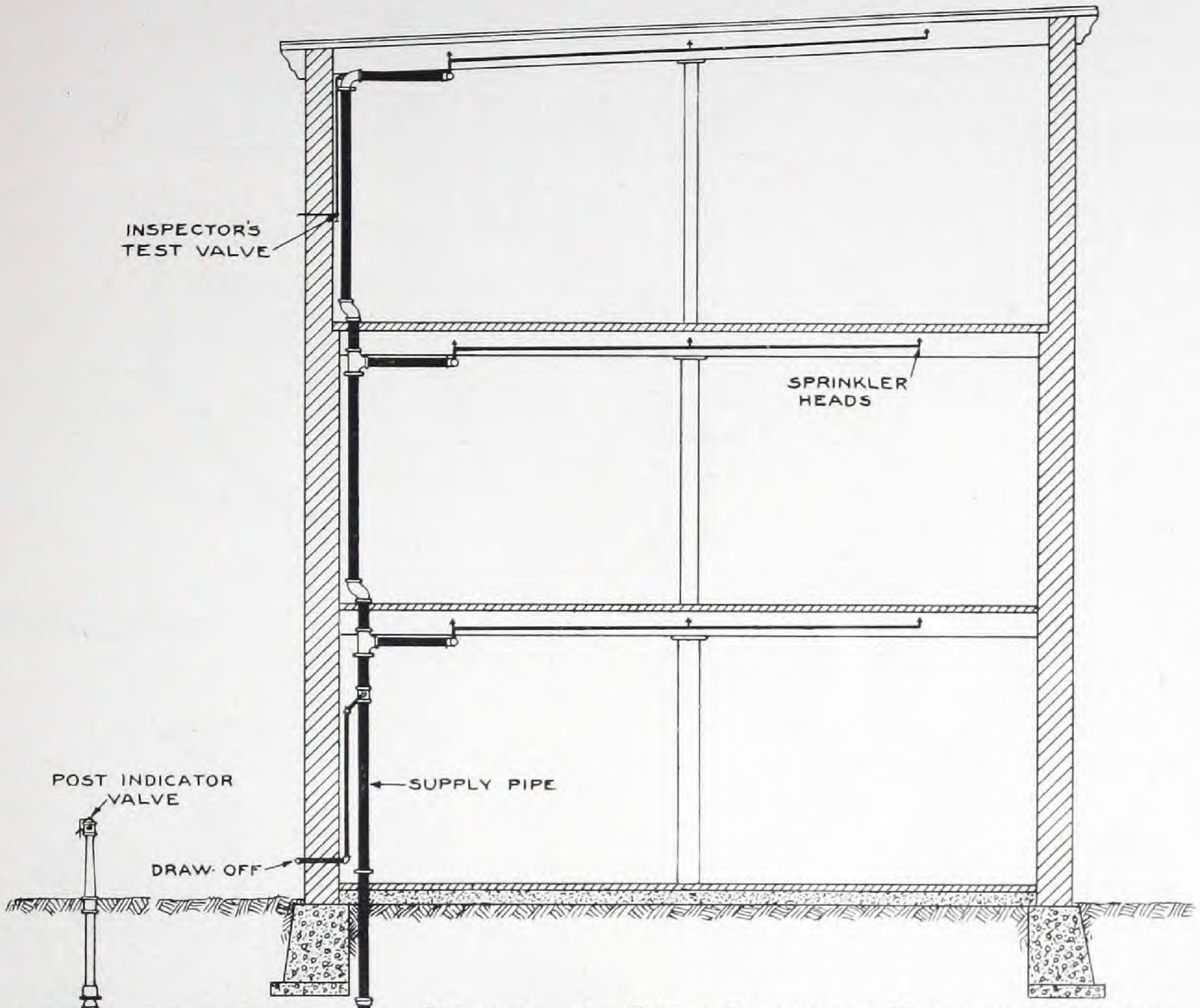
2—The danger of not promptly and properly drawing off the water when the cold weather approaches with consequent serious freezing is avoided.

3—Such change from dry-pipe to wet-pipe tends to the internal corrosion of the system.

If a dry-pipe system is kept dry throughout the year, a very considerable amount of the trouble due to freezing we believe would be eliminated. In case, however, your system is changed to wet-pipe during the warm weather, you should, before freezing weather sets in, see that all water is drawn off the system down to the dry-pipe valve. Complete instructions as to how this is done will be found on the pages listed in Index above at left for the various types of Grinnell Dry-Pipe Valves.

Instructions for maintaining Grinnell Dry Valve Accelerators when installed with various types of Grinnell Dry-Pipe Valves will be found on pages 76 to 83, also page 85.

Wet-Pipe System—Without Alarm Valves



DRAWING 6—CROSS SECTIONAL VIEW OF BUILDING EQUIPPED WITH AUTOMATIC SPRINKLERS, WET-PIPE SYSTEM—WITHOUT ALARM VALVES

The drawing above shows a wet-pipe system controlled by a Post Indicator Valve, but without having an Alarm Valve and Gong connected to the system. (See page 34 for detailed description of Post Indicator Valve.)

Special care should be taken to see that glass windows at top of all Post Indicator Valves show the word "OPEN." Ascertain the locations of the Post Indicator Valves about your building and have them inspected periodically. If any of them show "CLOSED" it means that the water is shut off your sprinkler system and that the sprinklers cannot therefore possibly be expected to put out a fire.

If any of the glass windows of the Post Indicator are missing or cracked, repairs should immediately be made, as water may get into the post, freeze and crack the cases.

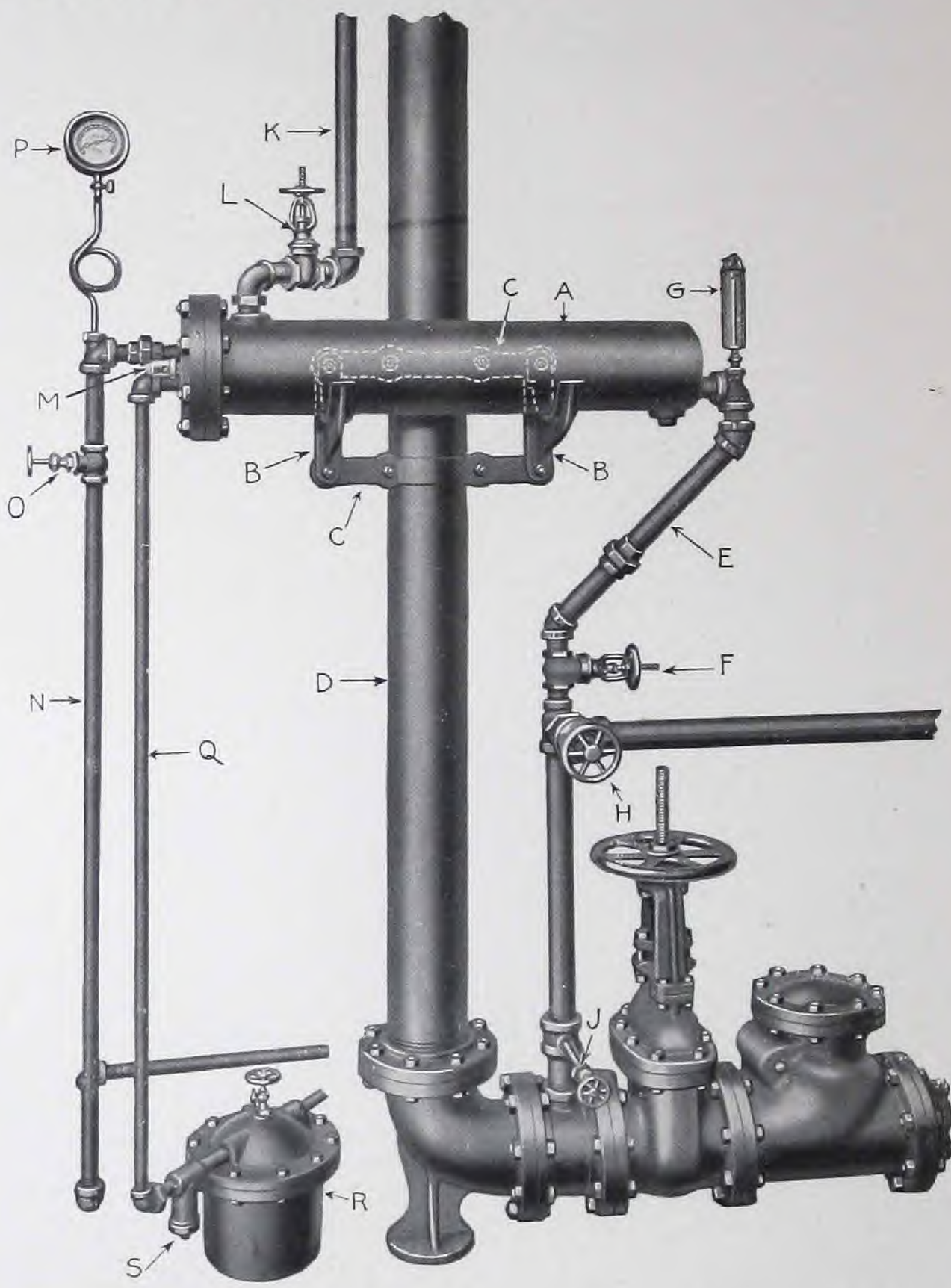
After Post Indicator Valves have been inspected and all show the word "OPEN," see that they are sealed in that position. If you are not provided with the proper seals take the matter up with your insurance company at once.

In case of any accident happening to the system, the Post Indicator Valve should be immediately closed and the Draw-off Valve, shown at the lower left hand corner of the illustration, opened, so as to draw off water from the system as quickly as possible. The same ruling applies in case of fire, but of course the Post Indicator Valve should not be closed until some responsible person has so authorized, after being sure that the fire is completely extinguished. As soon as the system is again in working order, the draw-off should be closed and the Post Indicator Valve opened, so as to put the system again in operative condition. The insurance inspectors test connection shown at the left top corner of the drawing is installed solely for the use of the accredited inspectors of the Underwriters having jurisdiction over your risk.

The Grinnell Tank Heater

In the old days of the sprinkler business a considerable number of gravity tanks were heated simply by running a steam pipe into the tank and letting it discharge there. This method, however, caused condensation and allowed the tank to overflow, which would in turn cause ice to form on the outside. This old method has of late years been superseded by various forms of tank heating devices, largely steam, but in a few cases, gas.

We show herewith the Grinnell Tank Heater, as an explanation of that heater and a few hints as to its maintenance will, we think, prove a reliable guide to most of the other tank heaters on the market.



Various Parts of Grinnell Tank Heater

"A" is the Tank Heater consisting of a cast iron shell and head with an internal coil of brass pipe.

"B-B" are Brackets which support the Tank Heater. They may be attached to the wall or frame of the building or, by means of Cross Bars "C" and yokes, to the Tank Riser "D."

"E" is the Return Pipe connection from the Tank Riser to the cold water inlet of the Tank Heater with an approved Valve "F" and a Thermometer "G" which tells the temperature of the water in the tank.

"H" is the Draw-off for the Tank and Tank Riser.

"J" is a ½" Draw-off Valve for draining water from the lower section of the Tank Riser "D."

"K" is the Flow Pipe from the Tank Heater up into the Tank with an approved Valve "L" located near the Tank Heater. The latest rules call for an O. S. & Y. Gate Valve directly under tank and for the Flow Pipe to be extended up into the tank for two-thirds its height, with full-sized cross at one-third and a tee at two-thirds the height of tank; also pipe to be securely braced.

"M" is a 1" Relief Valve set at 100 pounds, and installed in the head of the Grinnell Tank Heater, so that if the flow and return valves should be closed when the steam is turned on to the heater, any excess pressure due to the expansion of the water will be relieved.

"N" is the Steam Supply Connection to the Coil in the Tank Heater with a Controlling Valve "O" and a Pressure Gauge "P."

"Q" is the Drip Connection from the Coil in the Tank Heater to a Grinnell Steam Trap "R" with a Sediment Strainer "S". (For details of Trap, see opposite page.)

Operation and Maintenance

During the heating season the steam supply for a tank should be kept constant and always have a pressure of at least ten pounds, and not over one hundred pounds, to insure the proper

The Grinnell Tank Heater (Continued)

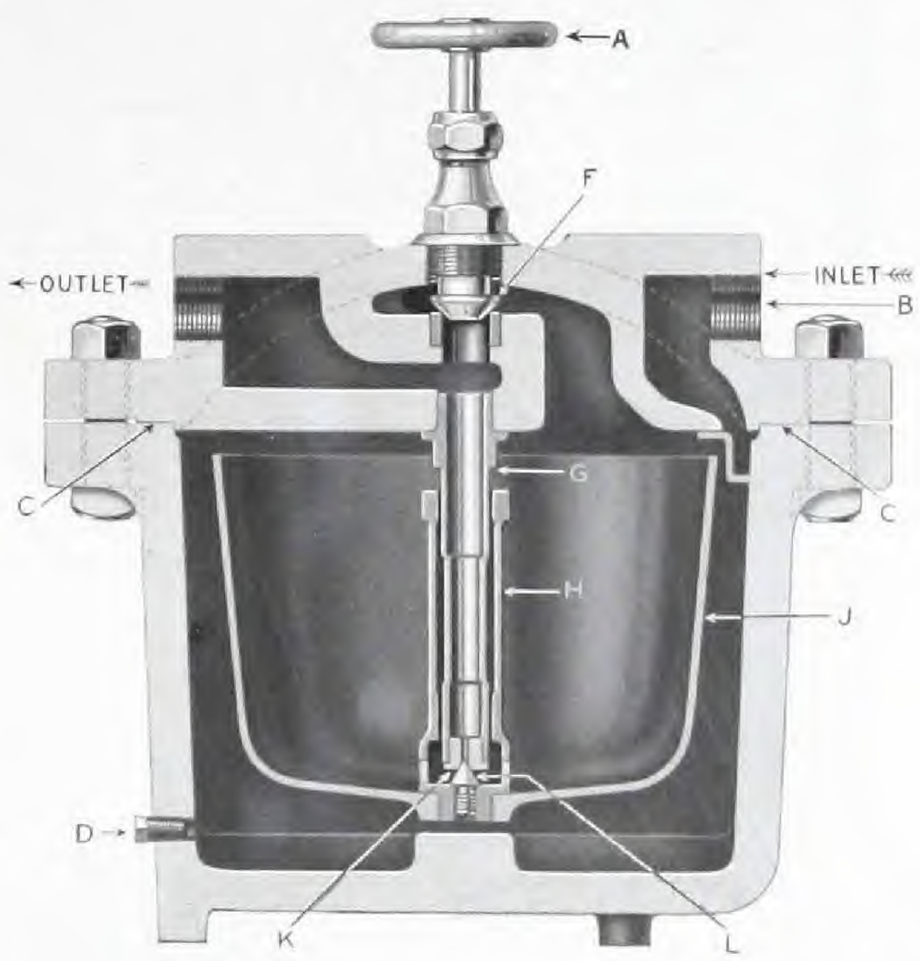
operation of the tank heater and steam trap. The steam supply pipe "N" and controlling valve "O" should be left wide open, as should also the valve "L" and the valve "F," and the discharge pipe from the steam trap should be carefully inspected, to see that it is open to the atmosphere and properly safeguarded against freezing.

Observe Thermometer daily. Keep temperature between 40°F and 50°F. Excessive heating is bad for tank and paint. Temperatures below 40°F are dangerously near the freezing point.

When ordering parts of Tank Heater for replacement be sure to indicate Page Number, Article Letter and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell Steam Trap

The illustration at right is a cross sectional view of the Grinnell Steam Trap. This Trap is shown used with the Underwriter Steam Fire Pump on page 26 to keep the steam supply pipe clear of water; also with the Grinnell Tank Heater on opposite page to take care of the condensation in the steam coil in the Heater.



These Traps are made in five sizes and three patterns. The Light Pattern is used for steam pressures, 0 to 25 lbs.; the Standard Pattern is used for steam pressures, 25 to 125 lbs.; the Extra Heavy Pattern is used for steam pressures, 100 to 200 lbs.

All Steam Traps should have Sediment Strainer attached to Inlet Pipe "B" so as to prevent, as far as possible, foreign matter collecting in trap and under Valve Seat.

Trap should discharge water only. Should steam escape through the discharge pipe it is an indication that the trap is out of order and is leaking. This may mean that valve seat "K" has become injured through the accumulation of sediment there. To remedy this, have the surfaces of the Valve Seat "K" ground by a good mechanic.

Whenever the trap is open for examination, wipe clean the ground joint "C" and apply a little oil before replacing the cover. Never use red lead or packing on the ground joint.

To clear the trap of water, or to prevent freezing, open drain pipe or drip "D."

Directions for Resetting

1st. Blow out the pipes to clear them from scale, etc.

2nd. Set the trap level on solid foundation.

3rd. Make the necessary connections including 1-8" pet-cock.

4th. Open pet-cock slightly to release air when first turning on steam.

5th. To quickly free the piping from water when first turning on the steam, open the by-pass valve "A." Then close the valve and the trap will continue to drain off the water automatically.

Replacement Parts

The following Replacement Parts can be furnished:

"A"—By-Pass Valve with Disc "F."
"G"—Bronze Spindle with Monel Seat "K."
"H"—Bronze Guide with Monel Disc "L."
"J"—Cast Iron Float.

When ordering parts of Grinnell Steam Traps for replacement, always specify: Name and Letter of parts; Size and Pattern of Trap; Steam Pressures under which it will operate. Also indicate Page Number and Booklet Edition Number. (This is the Fourth Edition.)

The Grinnell Mercury Gauge for Gravity Tanks

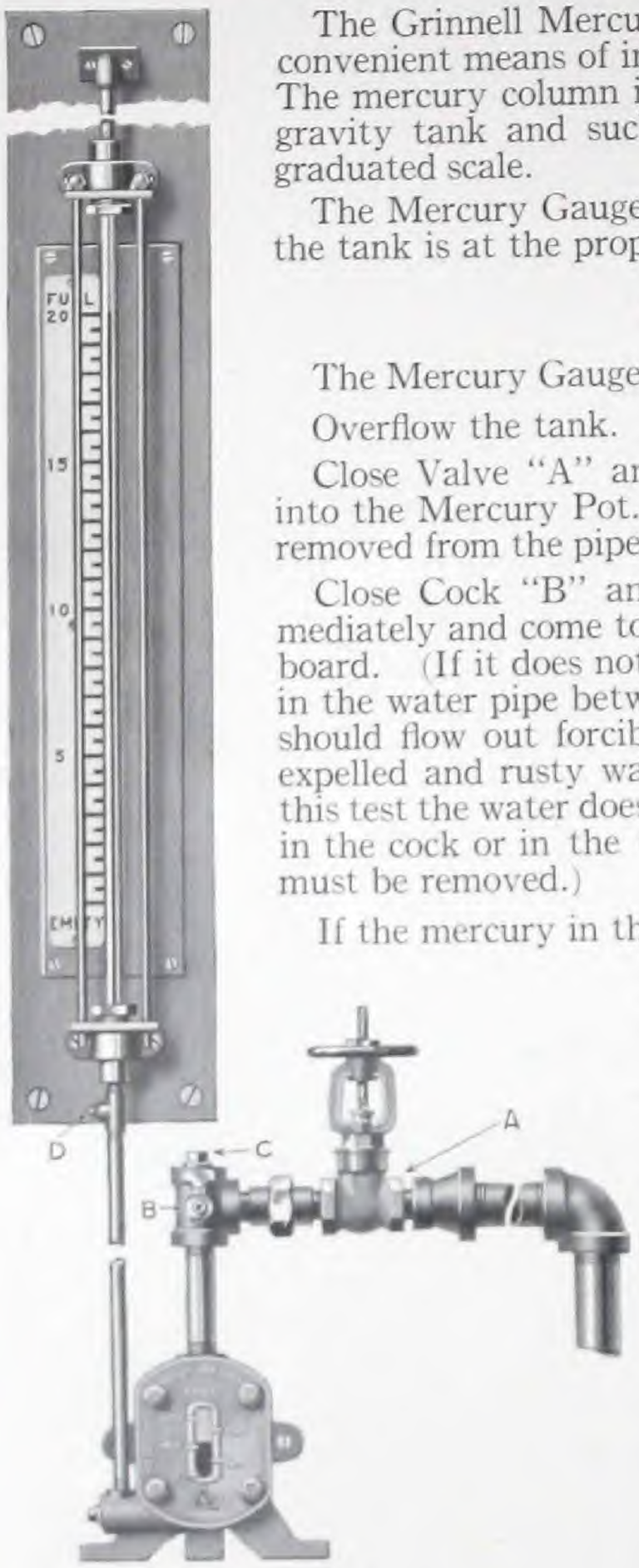


Fig. A

The Grinnell Mercury Gauge shown in Figure A furnishes an accurate and convenient means of indicating the amount or depth of water in gravity tanks. The mercury column in the glass gauge indicates the level of the water in the gravity tank and such level can be readily ascertained by referring to the graduated scale.

The Mercury Gauge should be looked at every day to see that the water in the tank is at the proper level.

To Test Mercury Gauge

The Mercury Gauge should be tested occasionally as follows:

Overflow the tank.

Close Valve "A" and open Cock "B." The mercury should quickly drop into the Mercury Pot. (If it does not, there is an obstruction which must be removed from the pipe or pot between the test cock and the gauge glass.)

Close Cock "B" and open Valve "A." The mercury should respond immediately and come to rest promptly opposite the "FULL" mark on the gauge board. (If it does not, there are probably air-pockets or possibly obstructions in the water pipe between tank riser and Cock "B." Open Cock "B." Water should flow out forcibly. Permit water to flow through "B" until all air is expelled and rusty water from the tank riser appears, then close "B." If in this test the water does not flow forcibly from Cock "B," there is an obstruction in the cock or in the water pipe between the tank riser and the cock which must be removed.)

If the mercury in the Pot cannot be seen through the glass window, extra mercury must be added, as follows:—Close Valve "A." Open Cock "B" to release water pressure and lower the mercury into the pot, then close "B" and remove Plug "C." Pour purified mercury slowly into the pot until it is filled to the level of the mark on the cover corresponding to the height of the full water level in the tank above the center of the Pot. Fill the balance of the Pot to overflowing with water. Replace Plug "C" and open Valve "A."

NOTE:—Use only purified Mercury. Mercury must never be allowed to come in contact with any metal except iron or steel, as it immediately amalgamates with the metal, spoiling it for further use, and if left in contact long enough will disintegrate the metal. Never use commercial or dirty mercury.

If there is water on top of the mercury column in the gauge glass it will cause inaccurate readings and must be removed. First lower the mercury into the pot by closing Valve "A" and opening Cock "B." Close Cock "B" and remove Plug "D." Open Valve "A" very slowly causing mercury to rise slowly and water above it to drain through "D." Close Valve "A" quickly when mercury appears at "D" but have a receptacle ready to catch any mercury that may drain out. Replace Plug "D." Replace any escaped mercury in the pot, as previously directed.

Table below gives the total amount of mercury necessary for various heights of the full water level above the center of the Mercury Pot for the style of pot now used and as shown in Figure "A." (Pots with a round cover, installed prior to 1916 require approximately 6 lbs. more mercury than specified in table.)

Height in feet:	25	50	75	100	125	150	175	200
Weight in lbs.	2½	3	3¾	4½	5¼	6	6¾	7½

Be Careful to Leave Valve "A" Open After Any Testing of the Gauge

When ordering parts of Mercury Gauge for replacement be sure to indicate Page Number, Article Letter and Booklet Edition Number. (This is the Fourth Edition)

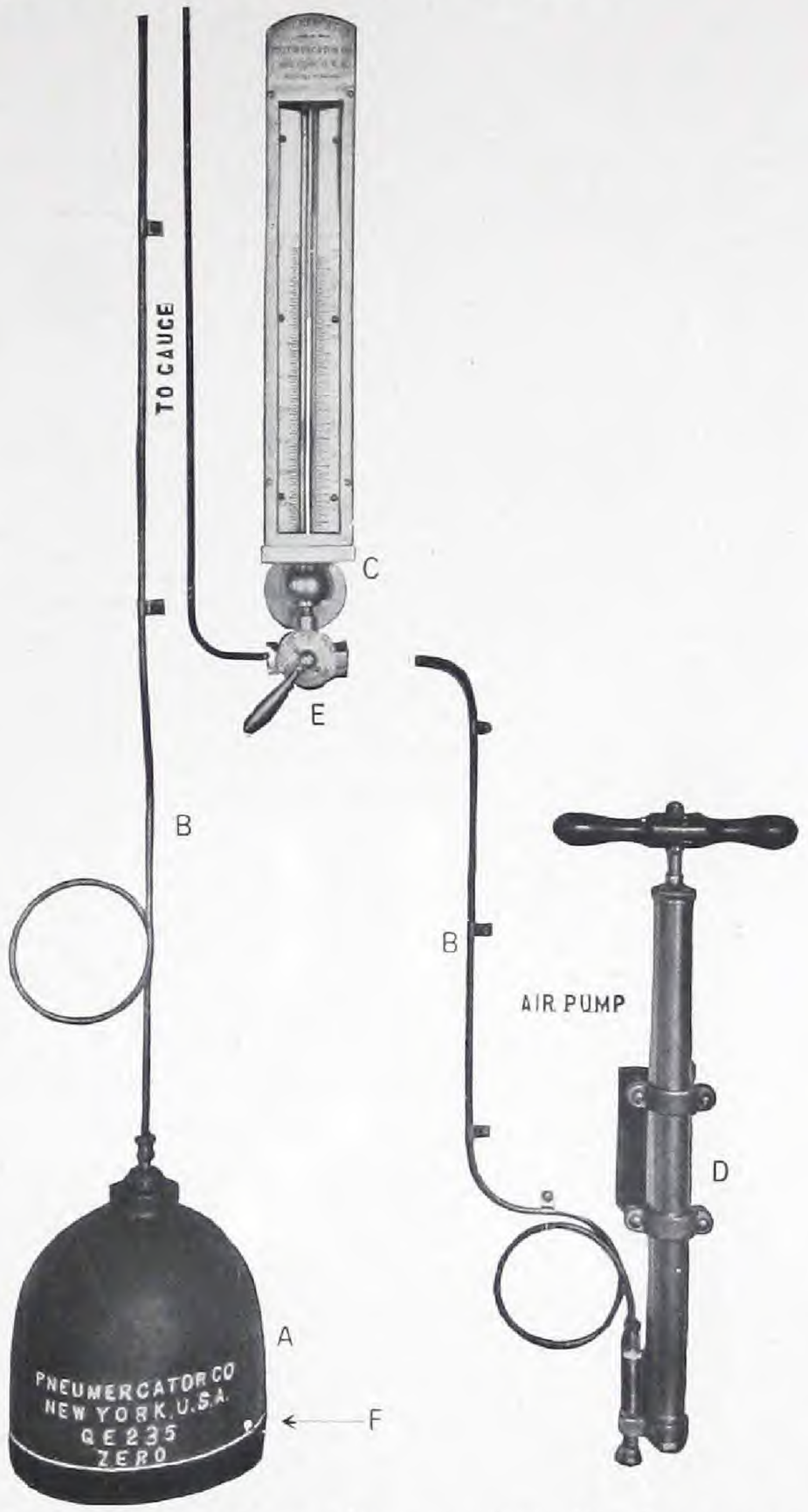
The Pneumercator Gauge for Gravity Tanks

The Pneumercator is a pneumatic device for measuring the depth of water in a gravity tank. The registering portion of this instrument can be located at any convenient place, either above or below the tank. The accuracy of this apparatus is not affected by changes in temperature. In fact, if the contents of a tank freeze, such freezing will be noted as soon as the tank is tested by the Pneumercator, a brief description of which is as follows:

The balance chamber "A" is an iron shell which rests on the bottom of the tank and has a direct opening to the water through the orifice at the zero line. Through an opening at the top, a small air pipe "B" is connected which leads to the mercury recording gauge "C." This gauge is calibrated in feet and inches. Attached to the bottom of the gauge is a controlling valve "E" to which the air pipe "B" from the tank is connected at one end, and the air pump "D" is connected at the other.

The handle of the controlling valve "E" may be set at four different positions, which are defined by an index on the valve marked "Gauge" —"Shut"—"Air"—"Vent", and makes connections between the balance chamber and the gauge, or all shut, or between balance chamber and air pump, or the reading of the mercury gauge can be returned to zero without losing the pressure then existing between the balance chamber and the mercury gauge.

A typical installation with a Sprinkler System is shown in Drawing 2, page 22.



The position of the control valve should normally be at "Gauge." As the water rises in the tank, it flows into the orifice "F" in the balance chamber until its weight or head compresses the air in the pipe and one balances the other. If this level is established at the orifice in the balance chamber, the mercury in the gauge will indicate the true depth of the water in the tank above the orifice.

Therefore, to set the gauge accurately, place the control valve in the position marked "Air" and connection is made between pump and balance chamber. A few strokes of the air pump are sufficient to force air into the balance chamber at a pressure in excess of that created by the water in the tank, thereby blowing out whatever water may be in the balance chamber above the orifice. The control handle is then placed at "Shut" and any excess air pressure escapes through the water. The air pressure in the pipe will exactly balance the head of water at the orifice. Now, place the control valve handle at "Gauge" and the air in the pipe line "B" exerts its pressure on the mercury so that the latter rises to a height to balance the air pressure, thus indicating the depth of water in the tank above the orifice, or zero point.

In case the instrument has not been read for some time, it is advisable to "blow out" the system as described above, to see if there are any leaks. If, after this is done, and the control valve returned to "Gauge" position, the reading is the same, no further test is necessary. But if the second reading is not the same as the first, place the control valve in the "Vent" position, thus allowing the mercury to return to zero. Turn the control valve handle to "Gauge" again, and if the mercury rises to the same height as before, the last reading is correct.

There is practically little or nothing to be maintained in this apparatus as there are practically no moving parts. The only thing necessary is to keep the air line free and open and see that the air pump D is always in operative condition.

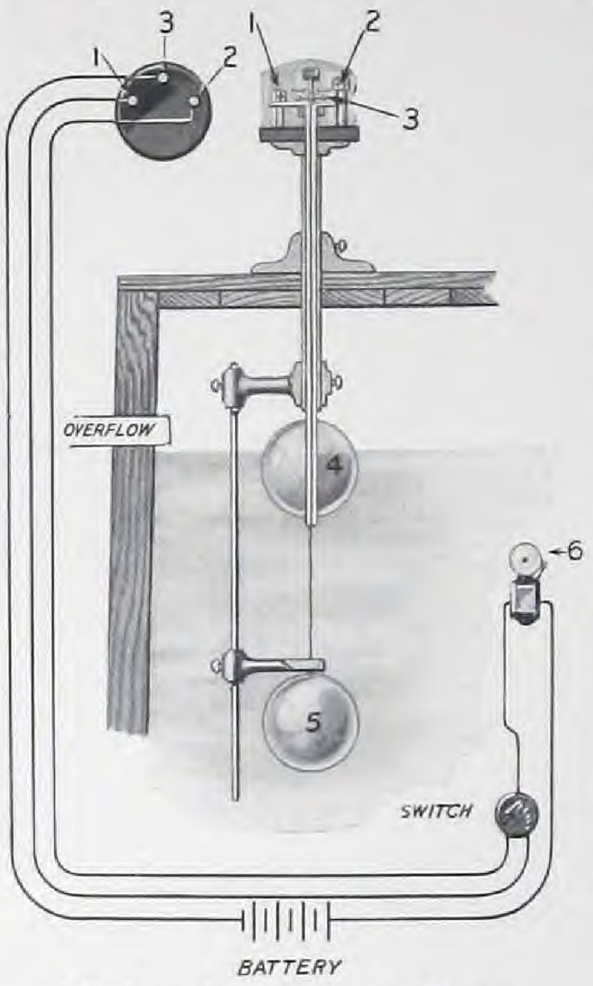
When ordering parts of Pneumercator for replacement be sure to indicate Page Number, Article Letter and Booklet Edition Number. (This is the Fourth Edition)

High and Low Water Alarm for Gravity Tank

(Used principally on sprinkler equipments in New York City)

The accompanying drawing shows the general arrangement of a high and low water alarm; the portion in section shows the top part of the tank and cover, also a diagram of the proper wiring from the tank to the electric gong which may be located at any convenient point.

The operation is as follows:—When the water rises in the tank and carries the float No. 4 beyond a predetermined position which locates the height of water which should be carried in the tank, an electrical contact is made and sends in the alarm. When the water in the tank falls below a predetermined point, the float No. 5 drops and makes an electric contact, sending in an alarm.



High and Low Water Alarm

Care should be exercised to see that the battery is in proper working order and all the wires are in contact, which can be readily accomplished by trying it out with a 2-point switch. Care should also be taken to see that Floats 4 and 5 are in good working condition and free from any water inside of the floats. This is liable to happen in old floats due to corrosion and if water is allowed to enter these floats their function as floats is destroyed; consequently the alarm is out of service. Care should also be taken to see that the electric contact points 1-2-3 are clean and free from any corrosion as badly corroded electric contacts will make the alarm inoperative.

The Grinnell Indicator Posts

Approved Post
Fig. A

Standard Post
Fig. B

Figures A and B show the Grinnell Indicator Posts attached to underground valves. Fig. A shows the Approved Post with a Sealing Wrench, the Wrench acting as a locking bar. Fig. B shows the Standard Post with Sealing Wrench. Either type of Post can be furnished with either a Sealing Wrench or a Hand-Wheel. The direction to turn the wrench or hand-wheel to open the valve is indicated by an arrow cast on the top of the Post.

When water is on your sprinkler system the word "OPEN" will be clearly seen through the face of the glass at the top of the Post which should be sealed in that position.

There is very little to maintain in these Indicator Posts as they have been made absolutely weather-proof and all parts likely to corrode are made of bronze. In addition, however, to seeing that valves are open, you should also examine the Post to see that the casing or the glass is not broken, as this allows debris to collect inside the Post, making it inoperative. In cases where the Posts are installed where there is constant danger of injury from teaming, etc., it is well to protect them with guards, care being taken to see that such guards do not in any wise interfere with the operating of the Posts nor with a clear view of the glass face which tells whether the valve is open or closed.

When ordering Sealing Wrenches, specify size and shape of nut on top of Post and whether to fit Standard or Approved Posts. When Sealing Wrenches are wanted for use on Standard Posts where staple for the Wrench is not cast into the Post, a special eye-bolt to be tapped into side of Post can be furnished.

When ordering Hand-Wheels, specify size and shape of nut on top of Post, also whether valves open to "Right" (clockwise) or "Left" (counter-clockwise).

The Grinnell Hose Cap
for Fire Department Connection

Fig. 1

Fig. 2

The ordinary Fire Department Connection to a sprinkler system is, to all practical intents and purposes, a reinforcement of the primary and secondary water supplies. Care should be exercised to see that there are no obstructions, such as stones, rags, etc., in this connection, so that in case an emergency arises the firemen can pump directly into the system to the full capacity of the pipe. In addition to seeing that there are no obstructions in the connection itself, care should also be exercised to see that rubbish, boxes, crates or other obstructions are not in the way, but are so placed as not to interfere in any way with firemen making this connection.

This second factor is a plain matter of housekeeping, but the first can be easily guarded against by once carefully examining the connection and then seeing that the proper hose cap is placed over the connection to prevent such obstructions being placed in the connection.

There are several types of hose caps on the market but the construction of a number of them is such that serious delays are often experienced by firemen in making a connection. We believe that the Grinnell hose cap accomplishes all the purposes of other caps and yet provides so easy and ready a means of opening up the connection that it deserves special consideration.

This Grinnell cap is made of cast iron and while it is rugged enough in construction to prevent the openings becoming clogged and to protect threads and couplings from injury, and to withstand any ordinary blows, it is of a breakable type and all that the firemen have to do to couple up is to strike with a spanner wrench one of the projections shown on Figure 1 and in detail at "C" in Figure 2, which breaks it off and allows the cap to fall free from the connection.

This hose cap is attached almost as readily as it is removed, which is shown by the accompanying illustration, Figure 2. In the illustration "A" is the cast iron cap, which is held in position by the copper connecting links "B," the links fitting over the lugs on the hose coupling and passing through the openings "D" and then being bent over to hold the cap in position. These links can be bent over with a small hammer and can be successfully installed by any workman.

We believe that the importance of the Fire Department Connection and the growing willingness and desire of firemen to have the first pumper at a fire connect up with a sprinkler system, warrants sprinkler system owners doing everything possible to encourage this practice. The ease with which the firemen can connect where a Grinnell hose cap is used we believe warrants their more general installation and we are in a position to quote attractive prices on them to owners of sprinkler equipments.

When ordering Grinnell Hose Caps, specify size of hose coupling, whether 2½, 3, or 3½ inches. Also indicate Page Number and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell Variable Pressure Alarm Valve

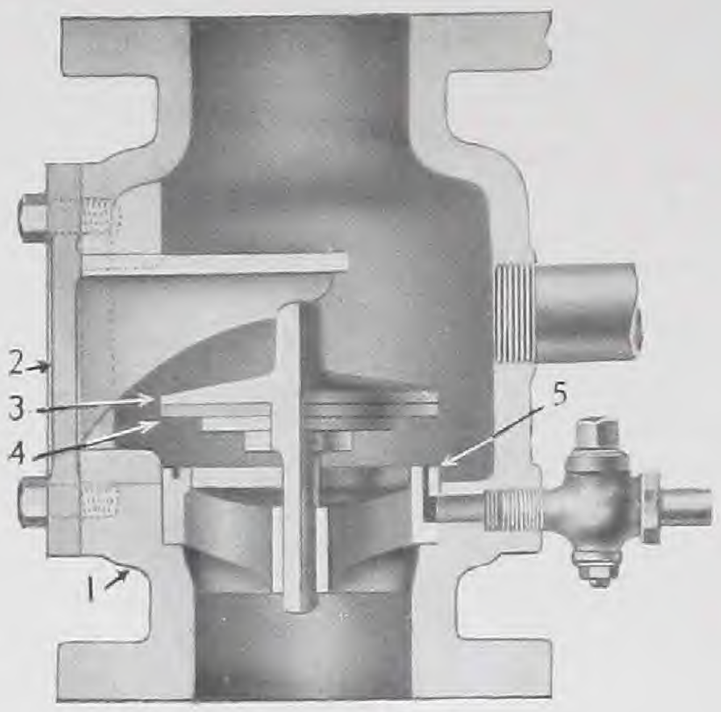


Fig. C

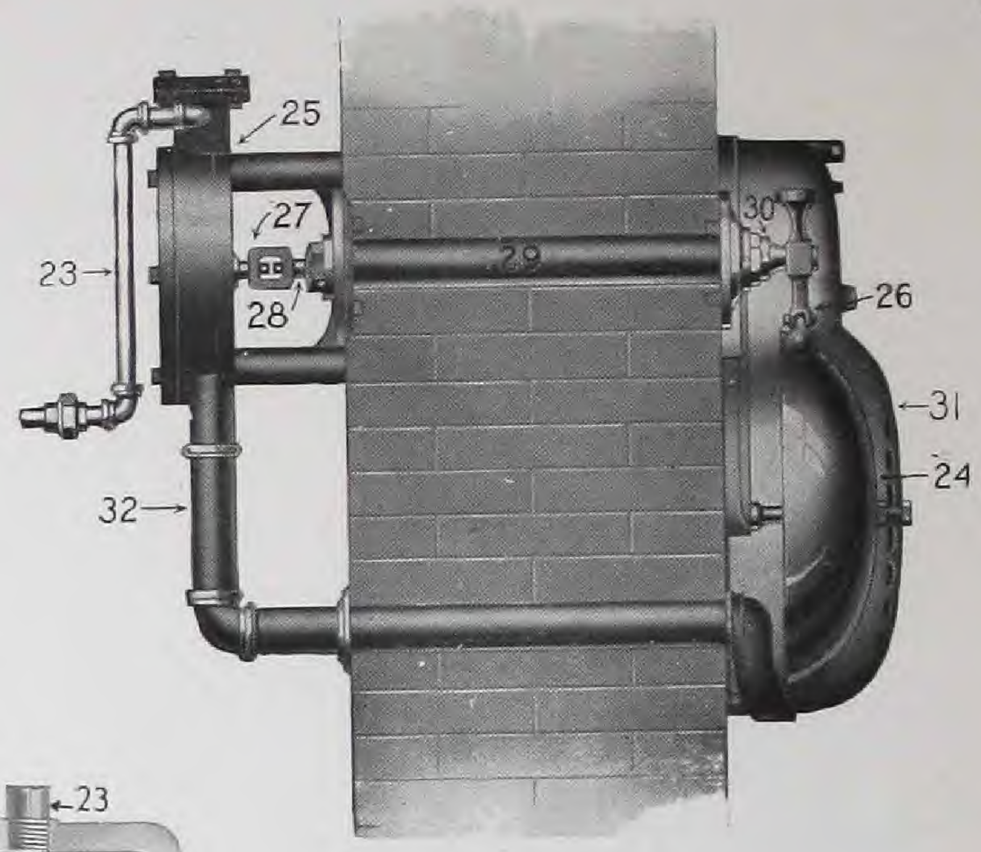


Fig. E

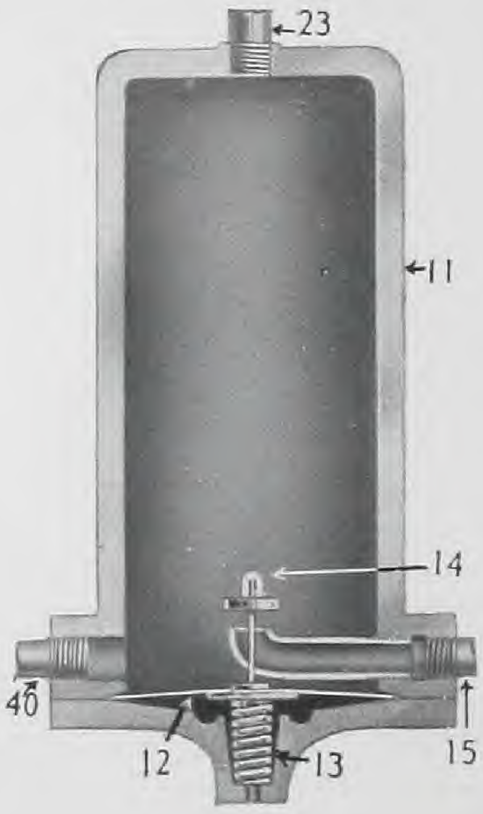


Fig. D

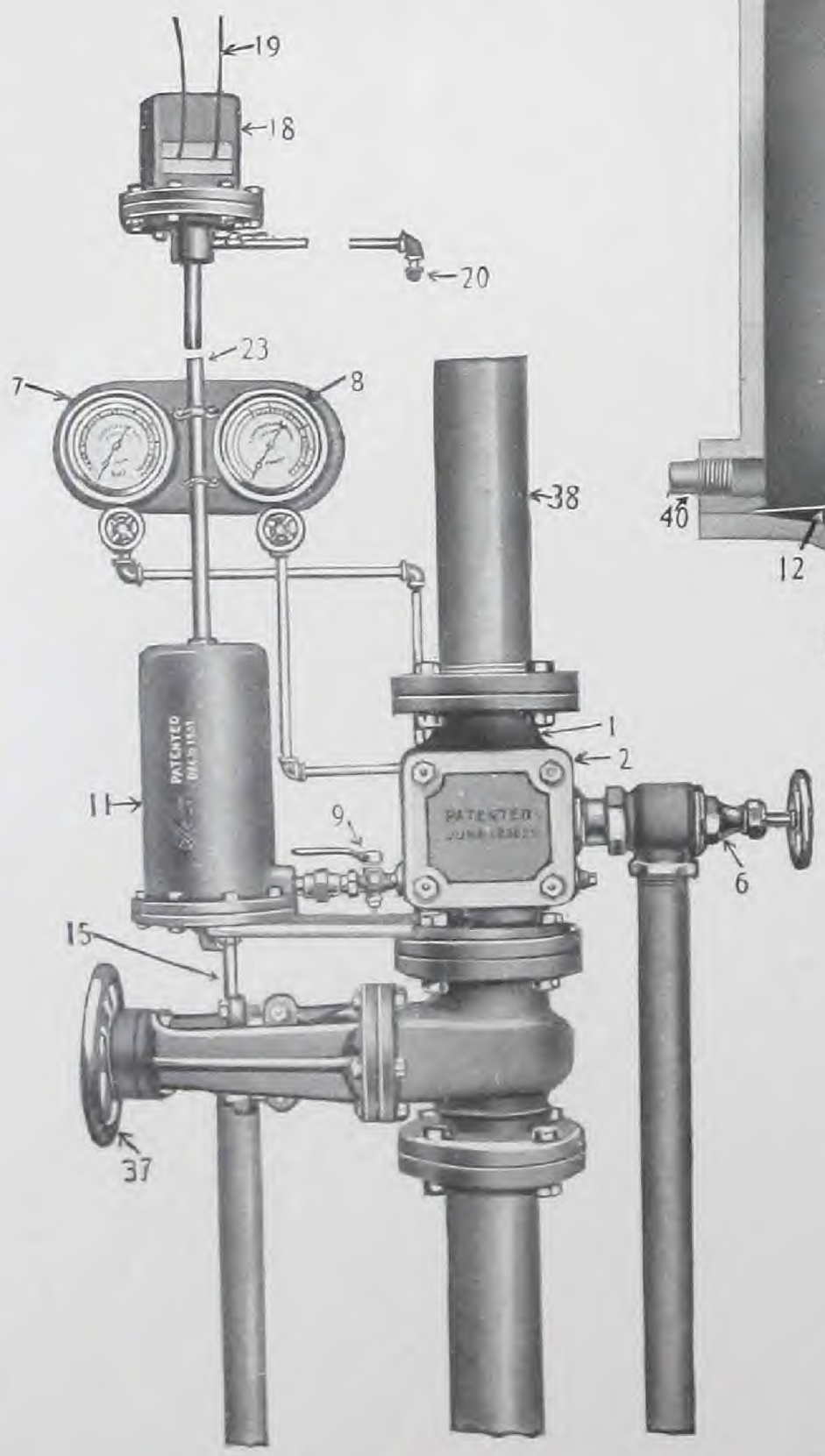


Fig. A.

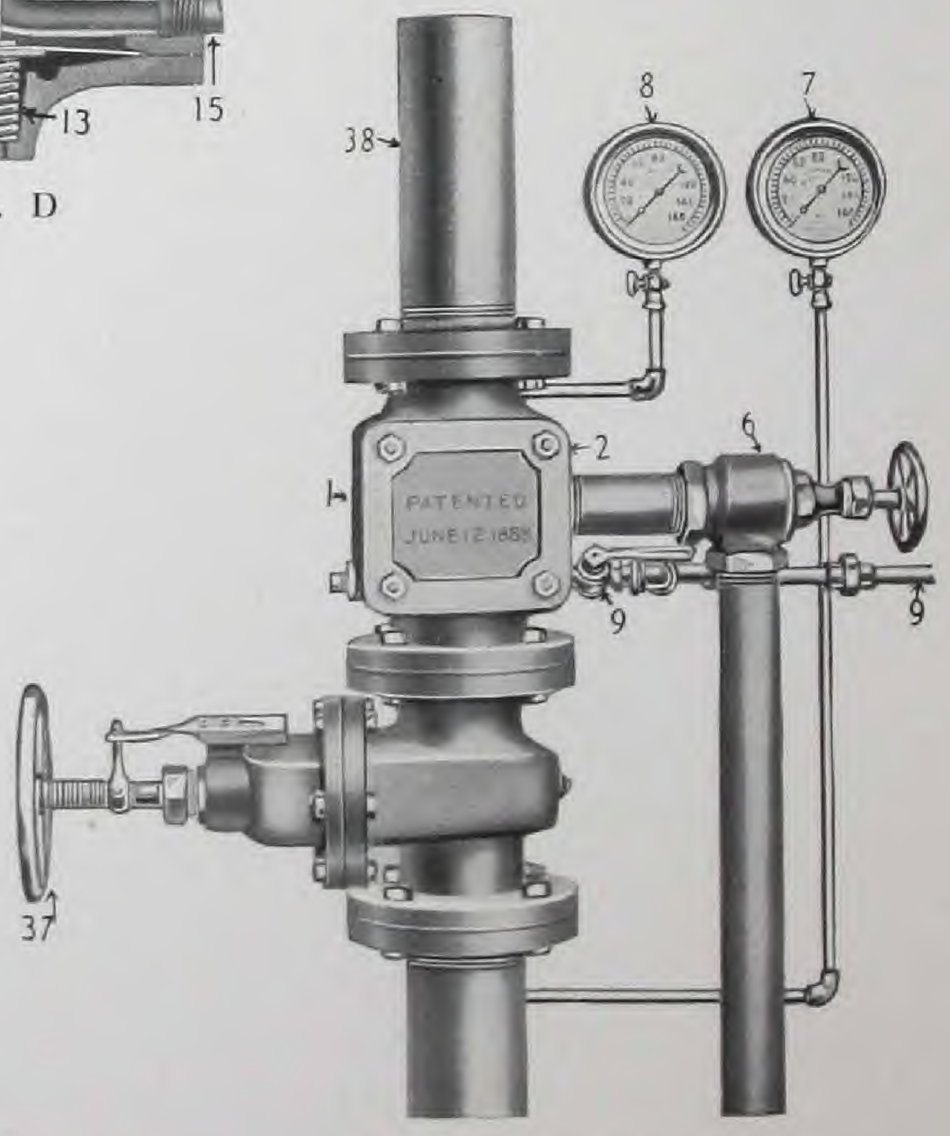


Fig. F *(See Note on Opposite Page)*

The Grinnell Variable Pressure Alarm Valve

Various Parts of Valve and Alarms

1—(Figs. A, C) Body of the Variable Pressure Alarm Valve.

2—(Figs. A, C) Removable Cover which allows of inspection or cleaning of inside of Alarm Valve.

3—(Fig. C) Valve Clapper of Alarm Valve.

4—(Fig. C) Special Renewable Rubber Valve Clapper Facing.

5—(Fig. C) Opening in the Valve Seat which allows the water to pass through Cock 9 into the Retarding Chamber 11 only when the Valve Clapper is raised from the Valve Seat.

6—(Figs. A, C) Main Draw-off Valve with pipe for draining the system.

7—(Figs. A, F) Pressure Gauge indicating pressure on the supply side of Alarm Valve.

8—(Figs. A, F) Pressure Gauge indicating pressure on system side of Alarm Valve.

9—(Figs. A, F) ½-inch Cock in pipe connecting Alarm Valve at Opening 5 with Retarding Chamber 11 and should be sealed open with a Valve Seal.

11—(Figs. A, D) Retarding Chamber to receive and discharge the temporary flow of water which occurs when the Valve 3 is lifted by variable pressure in supply pipe. Figure D is an enlarged sectional view of the Retarding Chamber 11, showing a Diaphragm 12 with Valve 14 attached, for closing Drip Pipe 15 when the Retarding Chamber 11 is filled by a continuous flow of water which occurs when the Valve 3 remains open to supply sprinklers which are in operation.

12—(Fig. D) Flexible metal Diaphragm which is forced downward by the pressure of water when Alarm Valve opens and closes Valve 14.

13—(Fig. D) Spring which forces Diaphragm 12 into open position.

14—(Fig. D) Valve which is automatically closed when Alarm Valve is open or while testing the Alarm and prevents water escaping through Drip Pipe 15.

15—(Figs. A, D) Drip Pipe from Retarding Chamber 11.

18—(Fig. A) Electric Alarm Circuit Closer.

19—(Fig. A) Double Wires for connecting the Circuit Closer 18 with the Electric Alarm Gong and the Electric Battery.

20—(Fig. A) Vent Pipe to be run to atmosphere and protected from freezing.

23—(Figs. D, E) Pipe connecting Variable Pressure Alarm Valve with Water Motor through Retarding Chamber 11.

24—(Fig. E) Alarm Gong.

25—(Fig. E) Water Motor operating Alarm Gong.

26—(Fig. E) Striker for sounding the Gong 24.

27, 28, 29, 30—(Fig. E) Connecting parts to Water Motor Alarm.

31—(Fig. E) Hood placed over Alarm Gong.

32—(Fig. E) 1½-inch Pipe for draining Water Motor 25.

37—(Fig. A) Gate Valve which controls water supply to system.

38—(Fig. A) Supply Pipe to System.

40—(Fig. D) Pipe leading from Variable Pressure Alarm Valve to the Retarding Chamber 11.

Figure F shows Grinnell Variable Pressure Alarm Valve as it was installed previous to the layout shown in Fig. A.

Manufacture of this type of Alarm Valve has been discontinued. We cannot furnish replacement Valves of this type nor furnish repair parts of the Valve with the exception of the rubber Valve Clapper Facing 4. (When ordering, specify Size of Valve.)

Should other repairs be necessary, we recommend that the Valve be replaced with a Grinnell Alarm Valve, Model "A," and connections, as illustrated on pages 44 and 45.

Should repairs to the Retarding Chamber be necessary, we recommend that it be replaced with a Model "A" Retarding Chamber.

We will allow a credit on old Alarm Valves or Retarding Chambers which are returned to one of our plants (charges prepaid) after being replaced.

For Water Motor Gongs, Circuit Closers, etc., see page 43.

When ordering rubber Valve Facings for Variable Pressure Alarm Valves for replacement be sure to indicate Page Number, Article Number and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell Variable Pressure Alarm Valve

Instructions for Maintenance

The illustrations on page 36 show several views of the Grinnell Variable Pressure Alarm Valve which was installed in many properties previous to the invention of the Grinnell Straightway Alarm Valve. In properly maintaining this Variable Pressure Alarm Valve, two distinct sets of circumstances must be held clearly in mind, as conditions where there is a steady non-fluctuating pressure as, for instance, with a gravity tank or pressure tank, are fundamentally different than where there is a varying pressure. Where the pressure on the system is non-fluctuating the pressure shown on the Gauges 7 and 8 in Figures A and F would be practically the same.

Where there is a variation in the pressure of the primary supply to the sprinkler system there should be a higher pressure indicated on the Gauge 8 in Figures A and F than is indicated on the Gauge 7 in Figures A and F, as with any such variable pressure there should be an accumulated pressure confined on the system side of the valve.

The Drip 15 in Figures A and D should always be free from leakage except at such times as water hammer or severe fluctuations in pressure are enough to open the main Valve 3, Figure C, which opening allows excess pressure to accumulate in the system as noted above. When the Valve 3 closes, the Retarding Chamber shown at 11 in Figure A and in section by Figure D, automatically releases the water thus admitted and allows the same to discharge from Pipe 15, Figures A and D, without giving any alarm.

If, however, instead of an intermittent and varying flow of water there is a continuous flow into the system, as would occur when a sprinkler opens, the Valve 3, Figure C, will open and allow the water to flow into the Retarding Chamber in sufficient volume to sound the alarms, both electric and water motor.

If there is on your system a varying water pressure as indicated earlier, and the Gauges 7 and 8, Figures A and F, indicate the same pressure, it is a sign that the Valve 3 in Figure C is leaking. If a leak is occasioned by this or any other cause, it will be readily observed by noting the discharge from Drip Pipe 15.

Leakage at the Valve 3 is usually caused by dirt or other foreign matter loading under the Valve 3, Figure C, or in some cases it may be due to an injury to the rubber Valve Facing 4, Figure C. In case of any leak at the valve from whatever cause, the Gate Valve 37, Figure A, should be closed, care being taken to notify the insurance interests of such closing and to station a man at the valve until it is opened again. After the gate valve is closed the system can be drawn off by opening the Draw-off Valve 6, Figure C. After properly drawing off the system the Cover 2, Figure A, can be removed, which allows ready examination of the bronze Disc 3, Figure C. See that the valve is clean and free from any obstruction and also carefully examine the rubber Valve Facing 4 to find if it is in perfect condition. Make sure that Groove 5 in Valve Seat is clear.

This proper cleaning and putting of the valve in working order will, if the system is tight, practically assure that with varying pressures an accumulated pressure will be set up on the system side of the valve, thus preventing false alarm. In case false alarms continue it is a sign that the system is leaking somewhere else. The most common place to find such leaks would be in the draw-off valve or in some pipe or sprinkler which has been injured, and it is important that such leakage be remedied that systems may be in proper working condition.

Water Motor and Electric Alarms

The Water Motor Alarm shown in Figure E is, as above noted, made operative by a water flow and to be sure that you will get a prompt alarm in case of fire this water motor should be periodically examined, to see that it is in perfect working order. You should primarily examine this alarm to see that the Water Motor Shaft 28, Figure E, and the Striker 26, Figure E, are perfectly free to revolve without undue pressure being exerted. It is well to occasionally oil these parts.

NOTE:—If Hood 31 of the old style made of galvanized iron and installed previous to 1916 becomes rusted or damaged, and your water motor is otherwise in good running condition, we suggest that you replace the old Hood with our Cast Iron Hood 31 as shown in Figure E, this being furnished complete with base.

If you have an Electric Alarm connected with your sprinkler system it should be periodically tested to ascertain if it is in working order and the batteries properly charged.

The Grinnell Supervisory Alarm Valve

With Local Alarm Only

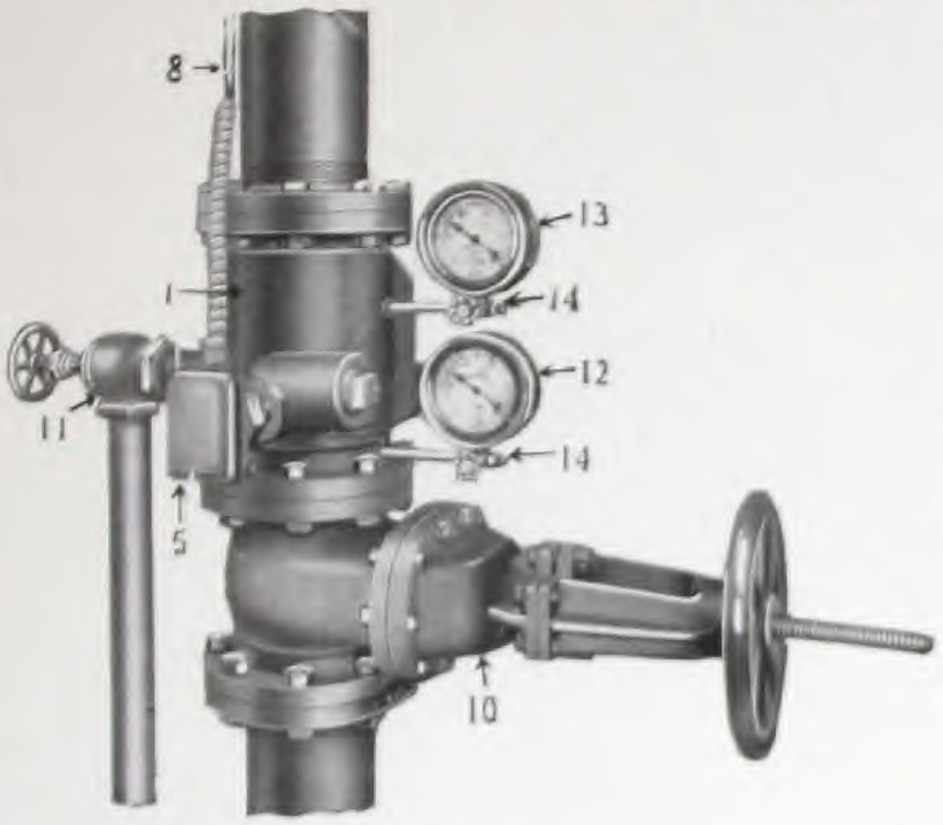


Fig. A

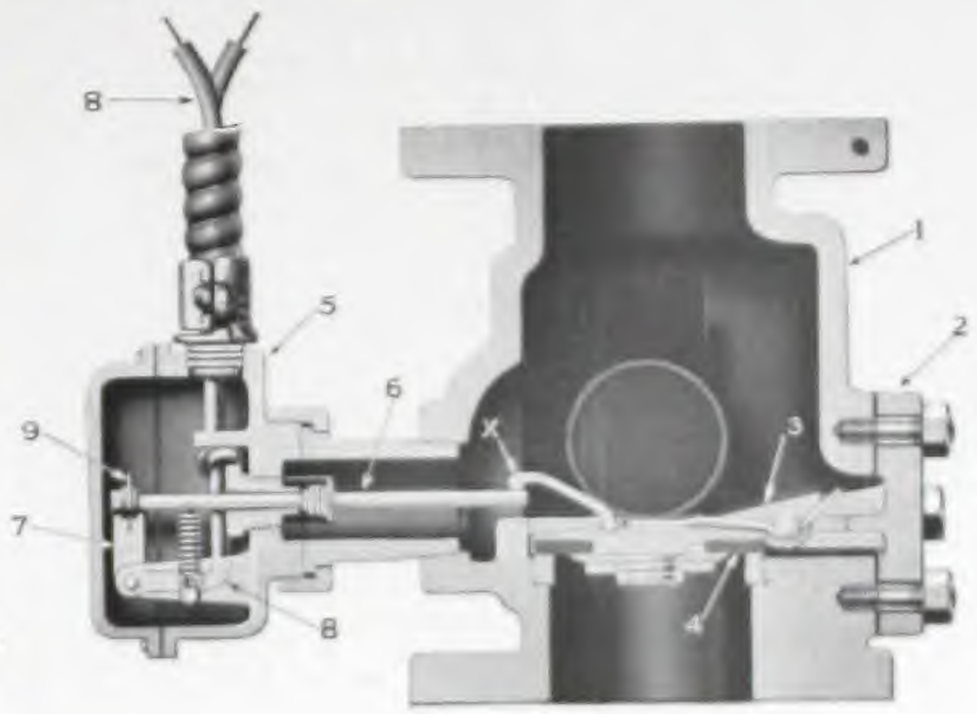


Fig. B

The Supervisory Alarm Valve shown as installed in Figure A, and in section in Figure B, is a very simple Alarm Valve, which can be installed only in systems which have a steady non-fluctuating water pressure, usually a gravity tank or pressure tank supply. The various parts of this Valve are as follows:

1—(Figs. A, B) Body of the Supervisory Alarm Valve.

2—(Fig. B) Removable Cover which allows inspection and cleaning of the inside of the Alarm Valve.

3—(Fig. B) Valve Clapper.

4—(Fig. B) Special renewable Rubber Valve Clapper Facing.

5—(Figs. A, B) Local Alarm Switch.

6—(Fig. B) Extension Stem which is held in position by engaging Step X of Valve Clapper 3.

7—(Fig. B) Contact Springs.

8—(Figs. A, B) Wiring leading to Electric Alarm, which may be located at any convenient point.

9—(Fig. B) Contact Disc.

10—(Fig. A) Main Gate Valve controlling system.

11—(Fig. A) Draw-off Valve for draining the system.

12—(Fig. A) Pressure Gauge to indicate water pressure on the supply side of Alarm Valve.

13—(Fig. A) Pressure Gauge to indicate water pressure on system side of Alarm Valve.

14—(Fig. A) ¼-inch Side Outlet Globe Valves which may be closed and used for testing Pressure Gauges by removing plugs and attaching Test Gauges.

Operation

This Valve, being installed only where there is non-fluctuating pressure, the pressure on the system and supply sides of the main Valve 3 are always equal. When a sprinkler head opens, pressure decreases on the system side, which immediately allows the Valve 3 to open.

The opening of the Valve 3 disengages the Step X from the Stem 6, which stem is then pulled down by the spiral spring shown in Figure B. This pulling down of the Stem 6 makes a contact at 7, which gives an electric alarm.

In cleaning this Alarm Valve the directions as given under the Grinnell Straightway Alarm Valve may be followed.

Maintenance

This Valve is so simple that there are practically only two parts which require maintenance, namely, the Valve 3 and the Contact Springs 7. The Valve 3 should be kept clean and free from sediment as any considerable leakage past the Valve 3 will cause an alarm to be sounded. If there are false alarms given and the Valve is clean it invariably means that there is either a fluctuation in the pressure of the supply or that there is a leak in the system somewhere above the Valve.

The Contact Springs 7 should be examined to see that they are always clean, so that alarm will be given when the contact is made by a falling of the Stem 6.

Manufacture of this type of Alarm Valve has been discontinued. We cannot furnish replacement Valves of this type, make repairs, or furnish repair parts of Valve except Rubber Valve Facing 4. (When ordering, specify Size of Valve.)

Should other repairs be necessary, we recommend that the Valve be replaced with a Grinnell Alarm Valve, Model "A." The Local Alarm Switch, Gauges and Draw-off as shown in Figure A above are the only Trimmings necessary when a Model "A" Valve is used in place of a Supervisory Alarm Valve. (When used in an "A. D. T." Supervised System, the "A. D. T." Wet Valve Alarm Switch takes the place of the Local Alarm Switch.)

Should repairs to the Local Alarm Switch be necessary, we recommend that it be replaced with a new one of latest design.

We will allow a credit on old Alarm Valves which are returned to one of our plants (charges prepaid) after being replaced, also on Local Alarm Switches.

When ordering rubber Valve Facings for Supervisory Alarm Valves for replacement be sure to indicate Page Number, Article Number and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell Straightway Alarm Valve

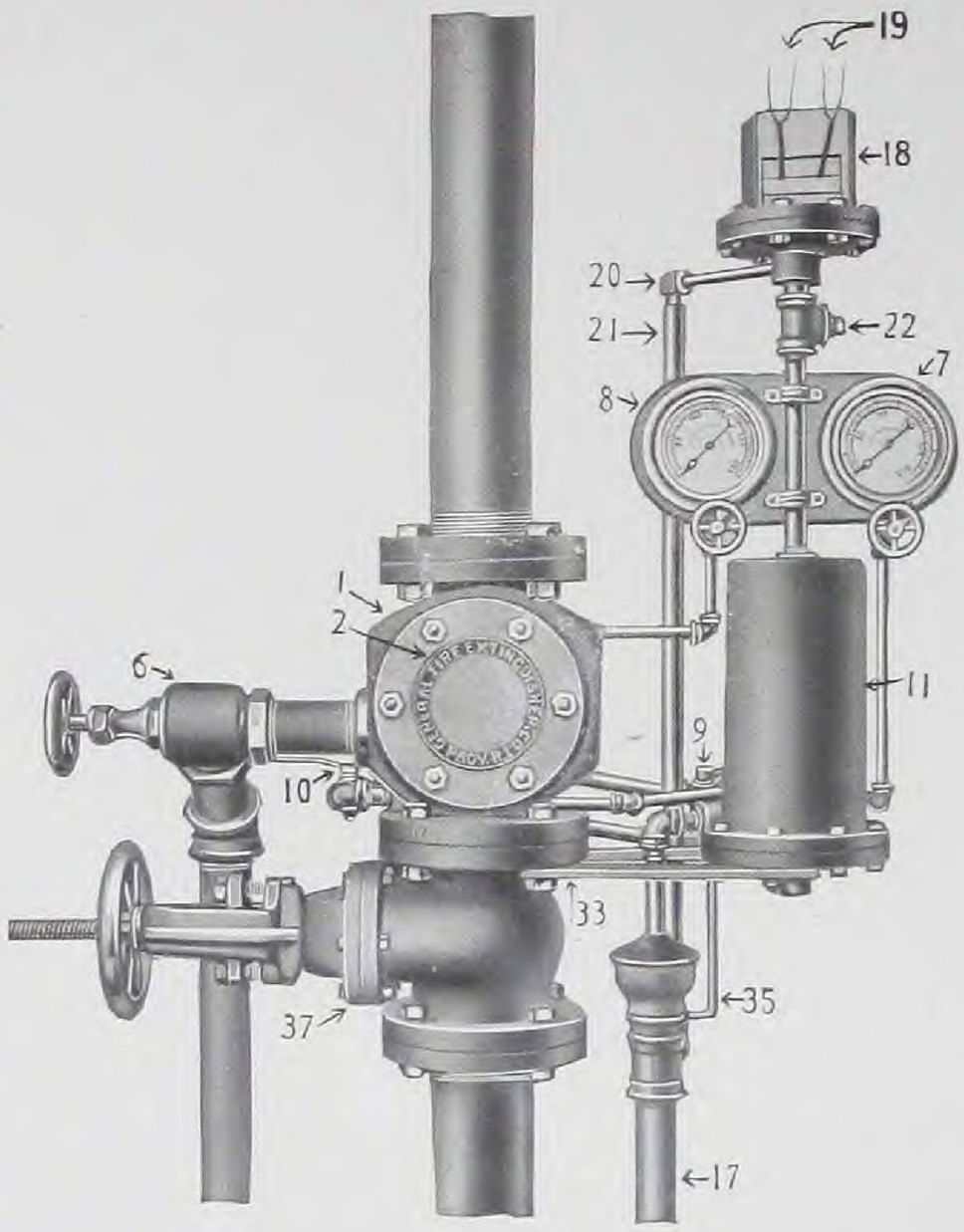


Fig. A

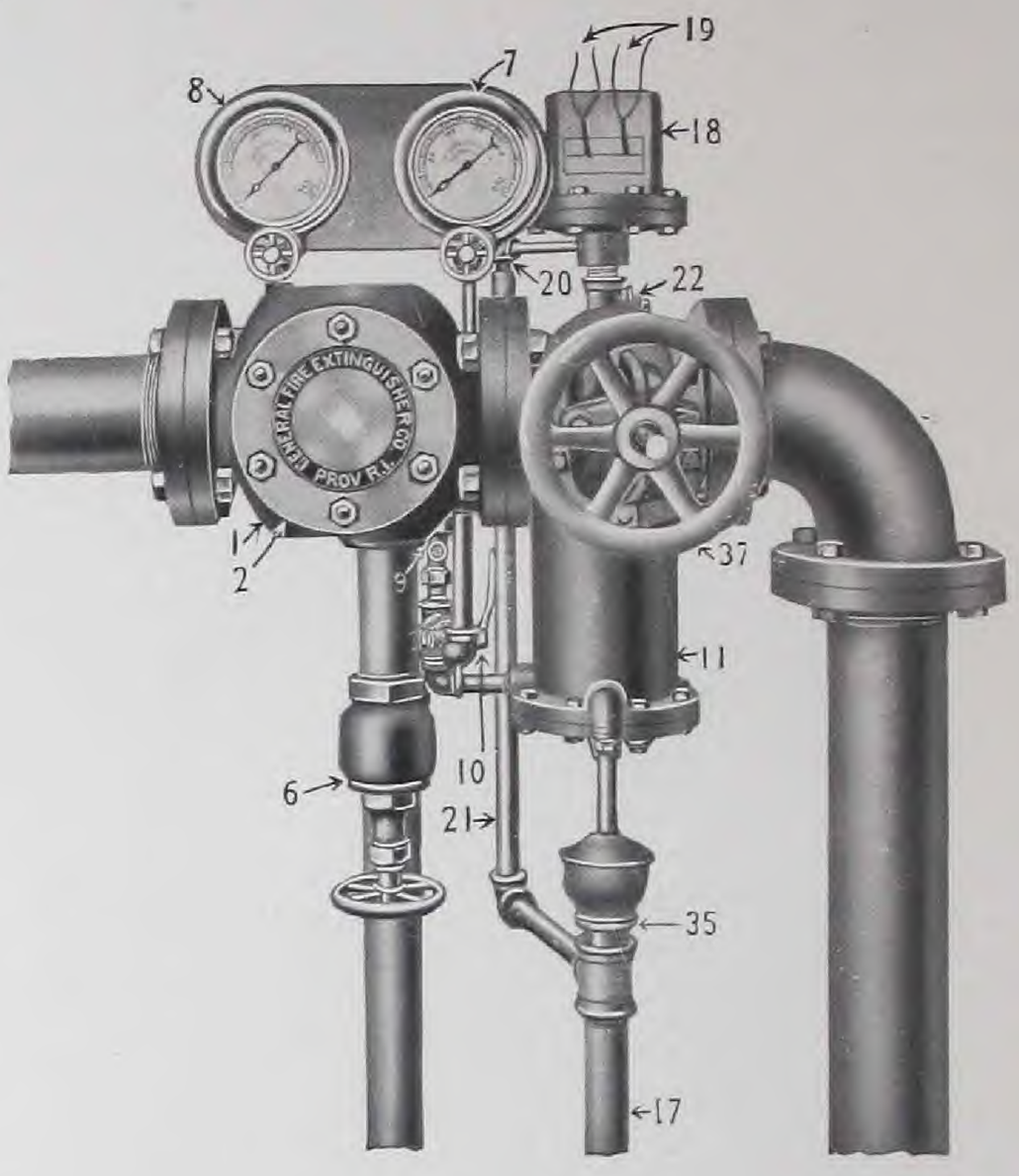


Fig. B

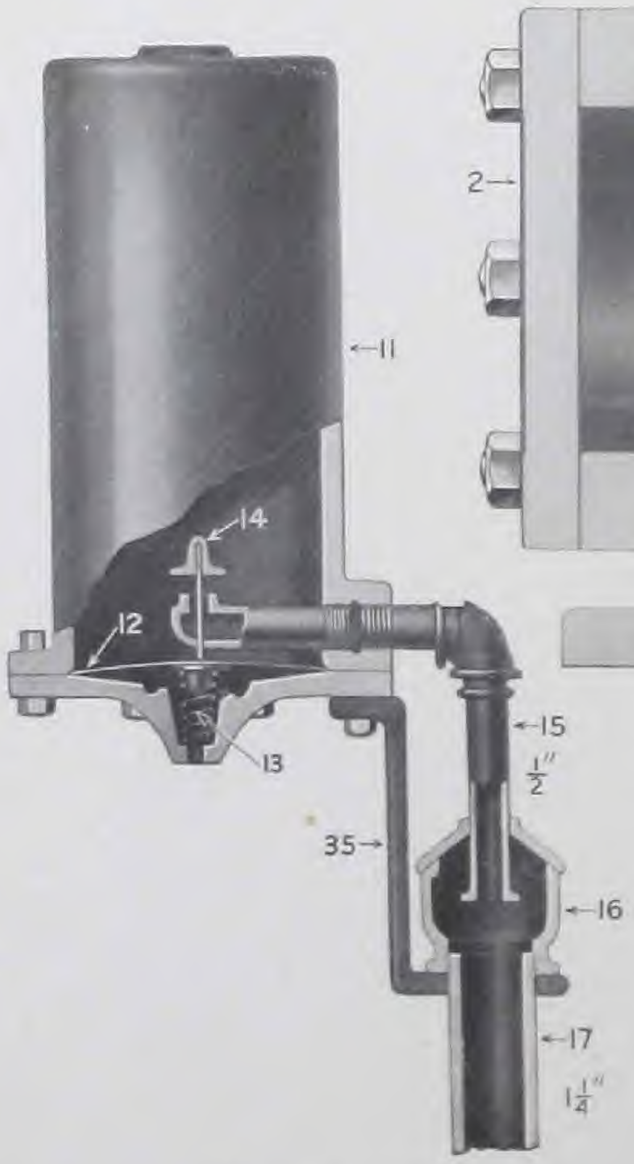


Fig. D

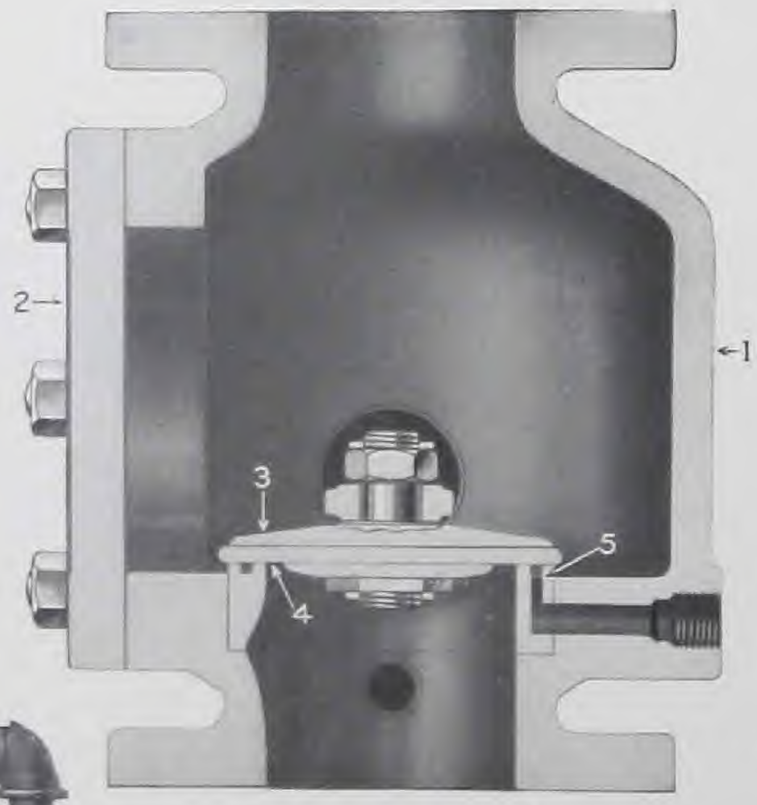


Fig. C

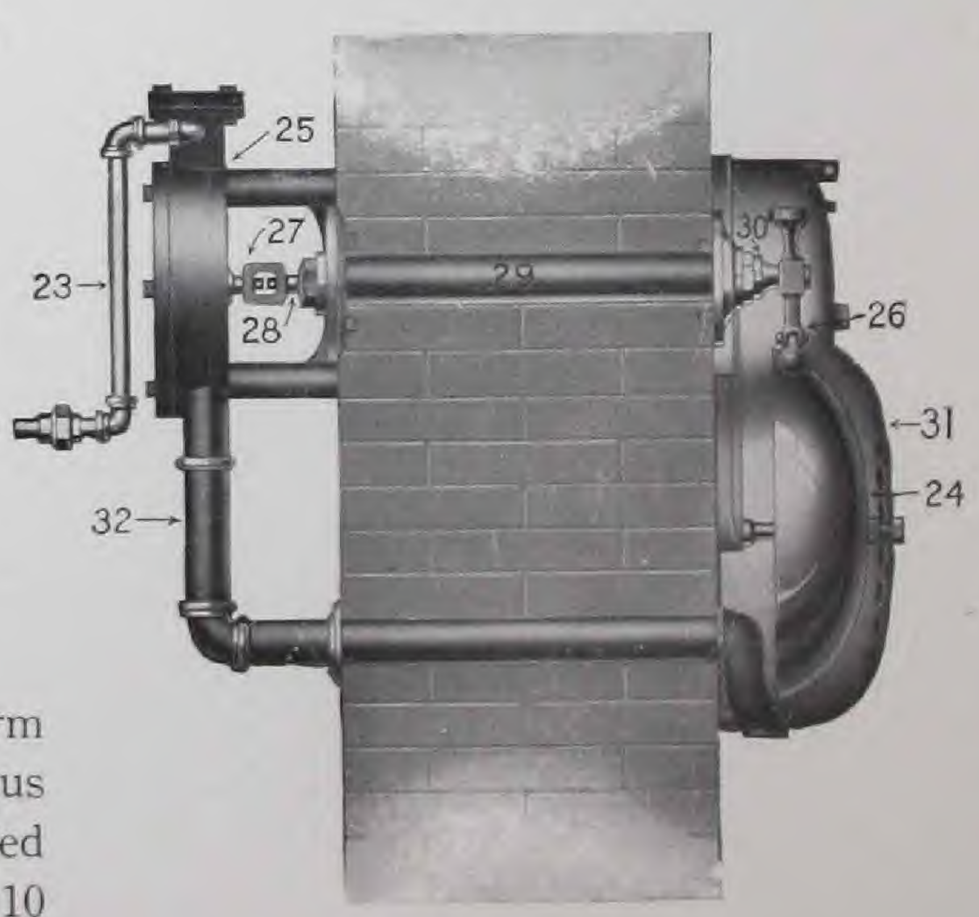


Fig. E

Note:- Straightway Alarm Valves furnished previous to 1913 were not provided with By-Pass Test Cock 10 and Connection.

The Grinnell Straightway Alarm Valve

Various Parts of Valve and Alarms

1—(Figs. A, B, C) Alarm Valve which can be installed either in a vertical or horizontal position.

2—(Figs. A, B, C) Removable Cover which allows of inspection or cleaning of inside of Alarm Valve.

3—(Fig. C) Valve Clapper of Alarm Valve.

4—(Fig. C) Special Renewable Valve Clapper Facing.

5—(Fig. C) Opening in the Valve Seat which allows the water to pass through Cock 9 into the Retarding Chamber 11 only when the Valve Clapper is raised from the Valve Seat.

6—(Figs. A, B) Draw-off Valve with pipe for draining the system.

7—(Figs. A, B) Pressure Gauge indicating pressure on supply side of Alarm Valve.

8—(Figs. A, B) Pressure Gauge indicating pressure on system side of Alarm Valve.

9—(Figs. A, B) ½-inch Cock in pipe connecting Alarm Valve at Opening 5 with Retarding Chamber 11 and should be sealed open with a Valve Seal.

10—(Figs. A, B) ½-inch Cock in By-pass Test Connection from below the Alarm Valve Seat to the Retarding Chamber 11 for testing the Alarm. Cock 10 should be kept closed.

11—(Figs. A, B, D) Retarding Chamber to receive and discharge the temporary flow of water which occurs when the Valve 3 is lifted by variable pressure in the supply pipe. Figure D is an enlarged sectional view of the Retarding Chamber 11, showing a Diaphragm 12 with Valve 14 attached, for closing Drip Pipe 15 when the Retarding Chamber 11 is filled by a continuous flow of water which occurs when the Valve 3 remains open to supply sprinklers which are in operation.

12—(Fig. D) Flexible metal Diaphragm which is forced downward by the pressure of water when Alarm Valve opens or Test Cock 10 is opened and closes Valve 14.

13—(Fig. D) Spring which forces Diaphragm 12 into open position.

14—(Fig. D) Valve which is automatically closed when Alarm Valve is open or while testing the Alarm and prevents water escaping through Drip Pipe 15.

15—(Fig. D) ½-inch Drip Pipe which empties into Receiver 16.

16—(Fig. D) Special funnel shaped Receiver with a removable cover.

17—(Figs. A, B, D) 1¼-inch Pipe for draining the Retarding Chamber through Pipe 15 and Receiver 16.

18—(Figs. A, B) Electric Alarm Circuit Closer.

19—(Figs. A, B) Double Wires for connecting the Circuit Closer 18 with the Electric Alarm Gong and the Electric Battery.

20—(Figs. A, B) Vent Elbow with a 1/8-inch vent.

21—(Figs. A, B) ¾-inch Drip Pipe from Vent Elbow 20 to Drip Pipe 17.

22—(Figs. A, B) Tee with ¾-inch outlet in pipe between Retarding Chamber 11 and Circuit Closer 18 to be installed only when Water Motor Alarm is used.

23—(Fig. E) ¾-inch Galvanized Pipe connecting Retarding Chamber 11 with Water Motor 25 through the Tee 22.

24—(Fig. E) Alarm Gong.

25—(Fig. E) Water Motor operating Alarm Gong.

26—(Fig. E) Striker for sounding the Gong 24.

27, 28, 29, 30—(Fig. E) Connecting parts to Water Motor Alarm Gong.

31—(Fig. E) Cast Iron Hood placed over Alarm Gong.

32—(Fig. E) 1½-inch Pipe for draining Water Motor 25.

33, 35—(Fig. A) Supports.

37—(Figs. A, B) Gate Valve which controls water supply to system.

This type of Alarm Valve has been superseded by the Grinnell Alarm Valve, Model "A," whose working parts are interchangeable with those of this type. See page 43 for replacement parts of Alarm Valves, Circuit Closers and Water Motor Alarms which can be furnished.

When ordering parts of Grinnell Straightway Alarm Valve for replacement be sure to indicate Page Number, Article Number and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell Straightway Alarm Valve

Instructions for Maintenance

The illustrations, A and B, page 40, show the Grinnell Straightway Alarm Valve installed in a vertical and a horizontal position. Figure C is a sectional view of the Alarm Valve, while Figure D is a sectional view of the Retarding Chamber 11.

In properly maintaining this Grinnell Straightway Alarm Valve two distinct sets of circumstances must be clearly held in mind, as conditions where there is a steady non-fluctuating pressure as, for instance, with a gravity tank or pressure tank are fundamentally different than where there is a varying pressure. Where the pressure on the system is non-fluctuating the pressure shown on the Gauges 7 and 8 in Figure A would be practically the same.

Where there is a variation in the pressure of the primary supply to the sprinkler system there should be a higher pressure indicated on the Gauge 8 in Figure A than is indicated on the Gauge 7 in Figure A. This differential would vary, as with any such variable pressure there should be an accumulated pressure confined on the system side of the valve.

The Drip 15 in Figure D should always be free from leakage, except at such times as water hammer or severe fluctuations in pressure are enough to open Valve 3, Figure C, which opening allows excess pressure to accumulate in the system as noted above. When the Valve 3 closes, the Retarding Chamber 11, shown in Figure A and in section by Figure D, automatically releases the water thus admitted and allows the same to discharge from Pipe 15, Figure D, without giving any alarm.

If, however, instead of an intermittent and varying flow of water there is a continuous flow into the system, as would occur when a sprinkler opens, the Valve 3 in Figure C will open and allow the water to flow to the Retarding Chamber in sufficient volume to sound the alarms, both electric and water motor. If there is on your system a varying water pressure as indicated earlier, and the Gauges 7 and 8, Figure A, indicate the same pressure, it is a sign that the Valve 3 in Figure C is leaking. If a leak is occasioned by this or any other cause, the leak will be readily observed by raising cover of Receiver 16, Figure D.

Leakage at the Valve 3 is usually caused by dirt or other foreign matter loading under the Valve 3, or in some cases it may be due to an injury to the rubber Clapper Facing 4, Figure C. In case of any leak at the valve from whatever cause, the Gate Valve 37, Figure A, should be closed, care being taken to notify the insurance interests of such closing and to station a man at the Valve until it is opened again. After the Gate Valve is closed the system can be drawn off by opening the Draw-off Valve 6, Figure C. After properly drawing off the system, the Cover 2, Figure A, can be removed, which allows ready examination of the Clapper and Seat. See that the valve is clean and free from any obstruction and also carefully examine the rubber Facing 4 to find if it is in perfect condition. Make sure that the Groove 5 in Valve Seat is clear.

This proper cleaning and putting of the valve in working order will, if the system is tight, practically assure that with varying pressures an accumulated pressure will be set up on the system side of the valve, thus preventing false alarm. In case false alarms continue it is a sign that the system is leaking somewhere else. The most common place to find such leaks would be in the Draw-off Valve 6 or in some pipe or sprinkler which has been injured, and it is important that such leakage be remedied that systems may be in proper working condition.

Water Motor and Electric Alarms

The Water Motor Alarm shown in Figure A is, as above noted, made operative by a water flow and to be sure that you will get a prompt alarm in case of fire this water motor should be periodically examined, to see that it is in perfect working order. You should primarily examine this alarm to see that the Water Motor Shaft 28, Figure E and the Striker 26, Figure E, are perfectly free to revolve without undue pressure being exerted. It is well to occasionally oil these parts.

NOTE:—If Hood 31 of the old style made of galvanized iron and installed previous to 1916 becomes rusted or damaged, and your water motor is otherwise in good running condition, we suggest that you replace the old Hood with our Cast Iron Hood 31 as shown in Figure E, this being furnished complete with base.

If you have an Electric Alarm connected with your sprinkler system it should be periodically tested to ascertain if it is in working order, and the batteries properly charged.

Alarms may be tested either by opening ¾-inch Inspector's Test Valve at top of system or by opening Valve 10 at the Alarm Valve. By using Valve 10, the Electric and Water Motor Alarms can be tested without disturbing the Alarm Valve Clapper. Test Valves should be closed after making test.

Replacement Parts—Grinnell Alarm Valves, Straightway and Model "A", Alarms, Etc.

Straightway Alarm Valve (Pages 40 to 42)

This type of Valve has been superseded by the Grinnell Alarm Valve, Model "A." Many details have been changed, but the various parts of the Model "A" Valve are interchangeable with those of the Straightway Valve, and will be furnished when replacement parts are ordered. (See notes below on Model "A" Valves.)

When Straightway Alarm Valves are replaced by Model "A" Alarm Valves and Connections, a credit will be allowed on return of the old Alarm Valve to one of our plants (charges prepaid).

Water Motor Alarm, Old Style (Pages 36 and 40)

The manufacture of this style has been discontinued. We can furnish, however, the following parts:—

Complete Striker Unit, including Slotted Striker 26, Striker Arm, and Rod 28.

Slotted Strikers, Arms for use with them, and Rods can be furnished as separate items to replace others of the same style.

Cast Iron Hood 31 complete with Base Plate.

NOTE:—Should repairs to the old Water Motor 25 be necessary, we recommend that it be replaced by a complete Model "A" Water Motor, Gong and Hood. A credit will be allowed on old Water Motors which are returned to one of our plants (charges prepaid) after being replaced.

Alarm Valve, Model "A" (Pages 44 to 47)

The following replacement parts for Model "A" Alarm Valve will be furnished, which parts will also be furnished when corresponding parts are ordered for the Straightway Alarm Valve:—

Alarm Valve Clapper 3 and Clapper Arm, complete. (Specify size of Valve when ordering.)

Rubber Clapper Facing 4. (Specify size of Valve when ordering.)

Trimmings, Accessories, etc. (Pages 44 to 47)

The following Trimmings or Accessories as illustrated with the Model "A" Alarm Valve will be furnished as replacements with this Model; also as replacements or extras to the Variable Pressure and Straightway Types:—

Retarding Chamber, Model "A," 11, complete.

Circuit Closer 18, complete

- Top Cover
- Bronze Diaphragm
- Rubber Gasket between Diaphragm and Base
- Moulded Bakelite Plunger

NOTE:—While parts listed above will be furnished on order, we recommend that the Circuit Closer either be replaced with a new one, or that the old one be returned to our Providence Plant for repairs. If repairs are impractical, an allowance will be made in the price of a new one. If a new Circuit Closer is ordered for replacement, a credit will be allowed on return of the old Circuit Closer to one of our plants (charges prepaid.)

Water Motor Alarm, Model "A," 24 to 31, complete

- Water Motor 25, complete
- Striker Shaft or Rod 28
- Striker Shaft Bearing 29 complete with oilless bearing and Bearing Unit
- Striker Arm with Striker 26 and Counterweight complete
- Gong 24
- Cast Iron Hood 31 complete with Base Plate

Electric Alarm Gongs, Complete

Restriction By-Pass Complete, including Restriction Unit 38 and Check Valve 39; or parts will be sold separately.

Gauges, Cocks, small Valves, Supports, Drip Receiver, etc., not otherwise mentioned to the contrary.

The Grinnell Alarm Valve, Model "A"

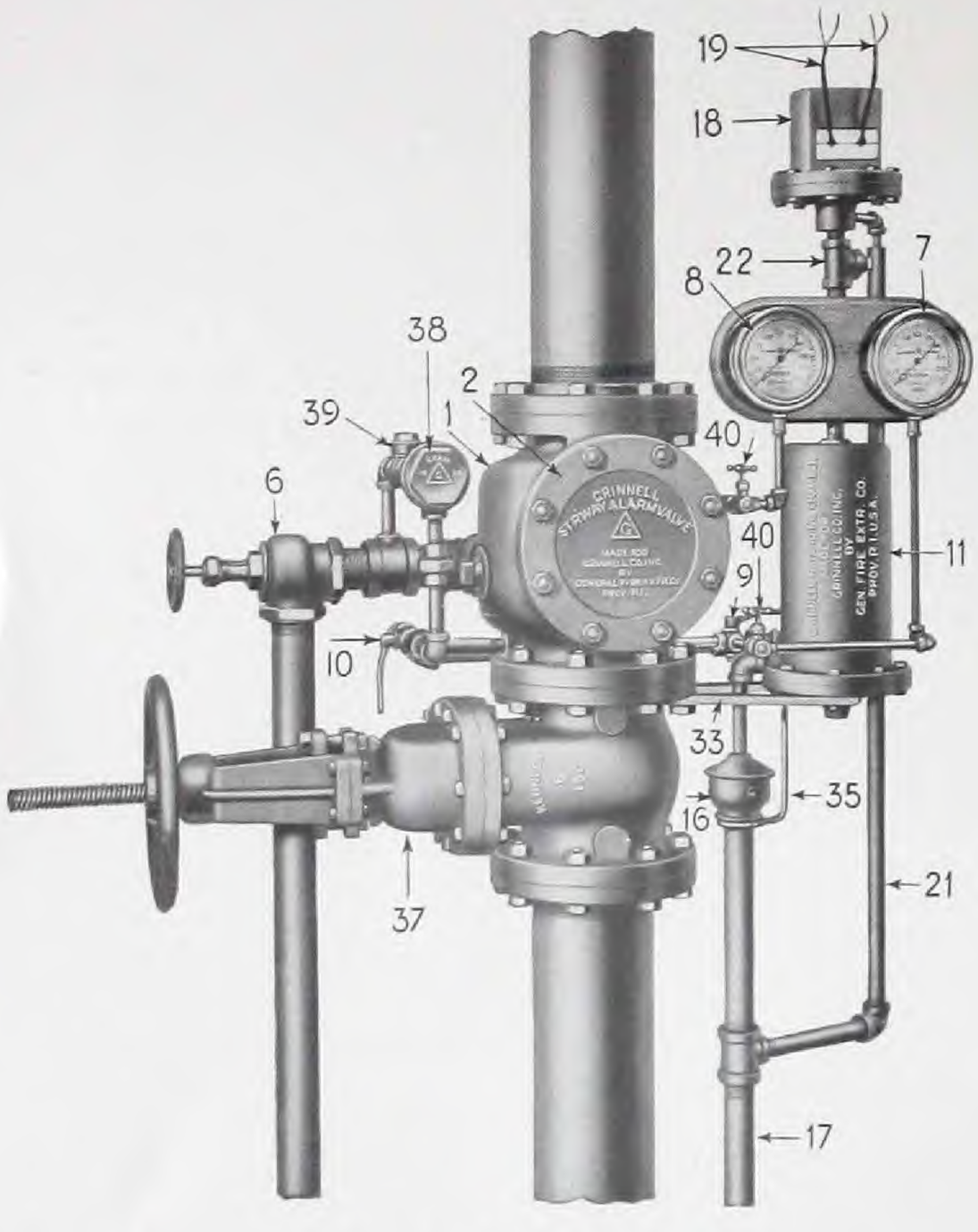


Fig. A—Vertical

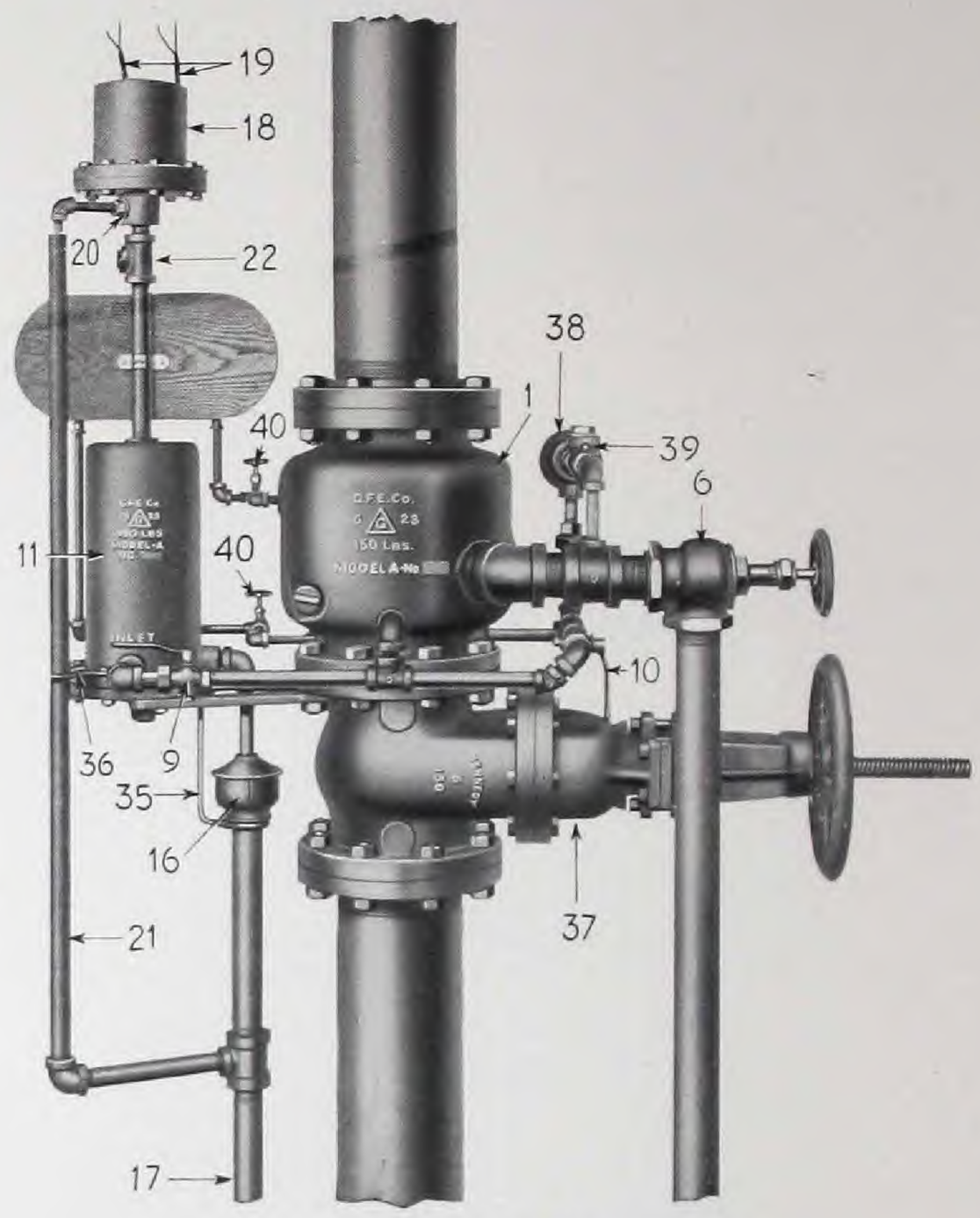


Fig. B—Vertical

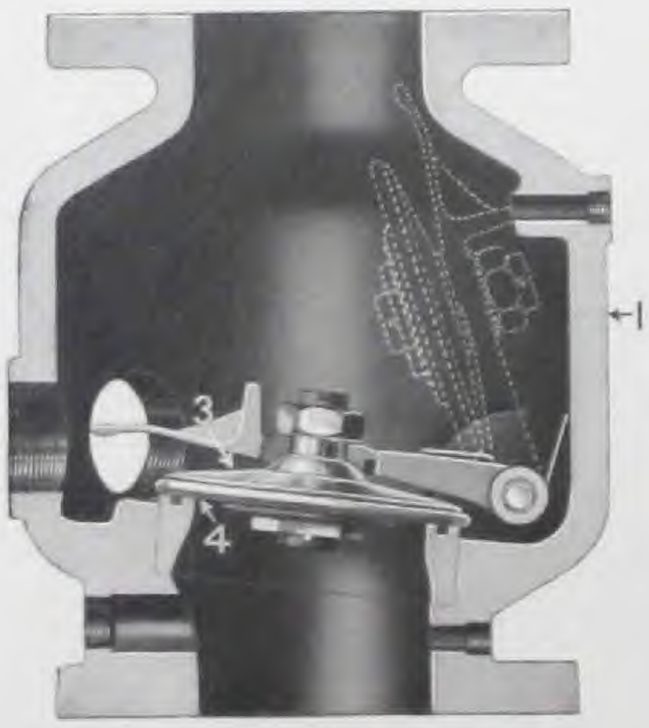


Fig. C.

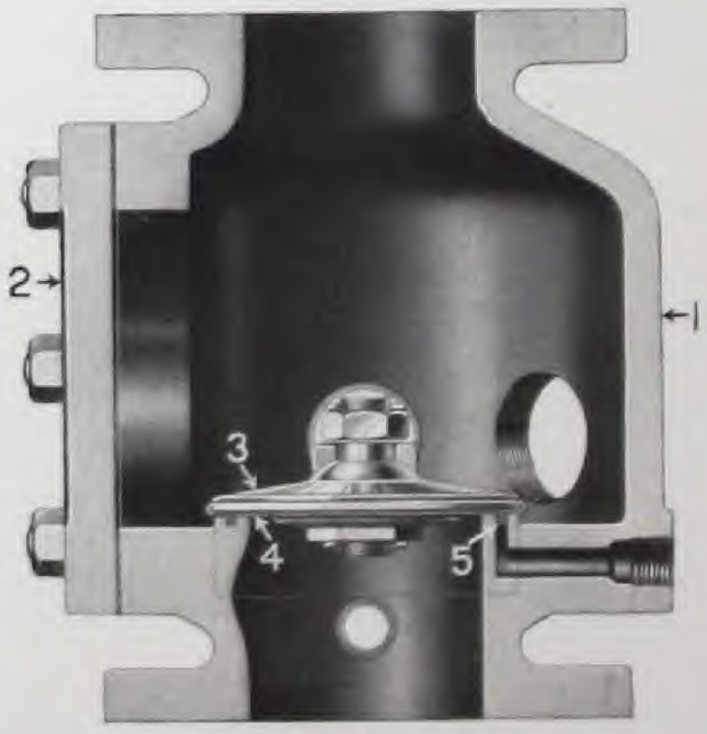


Fig. D.

See page 43 for replacement parts of Alarm Valves, Circuit Closers and Water Motor Alarms which can be furnished.

The Grinnell Alarm Valve, Model "A"

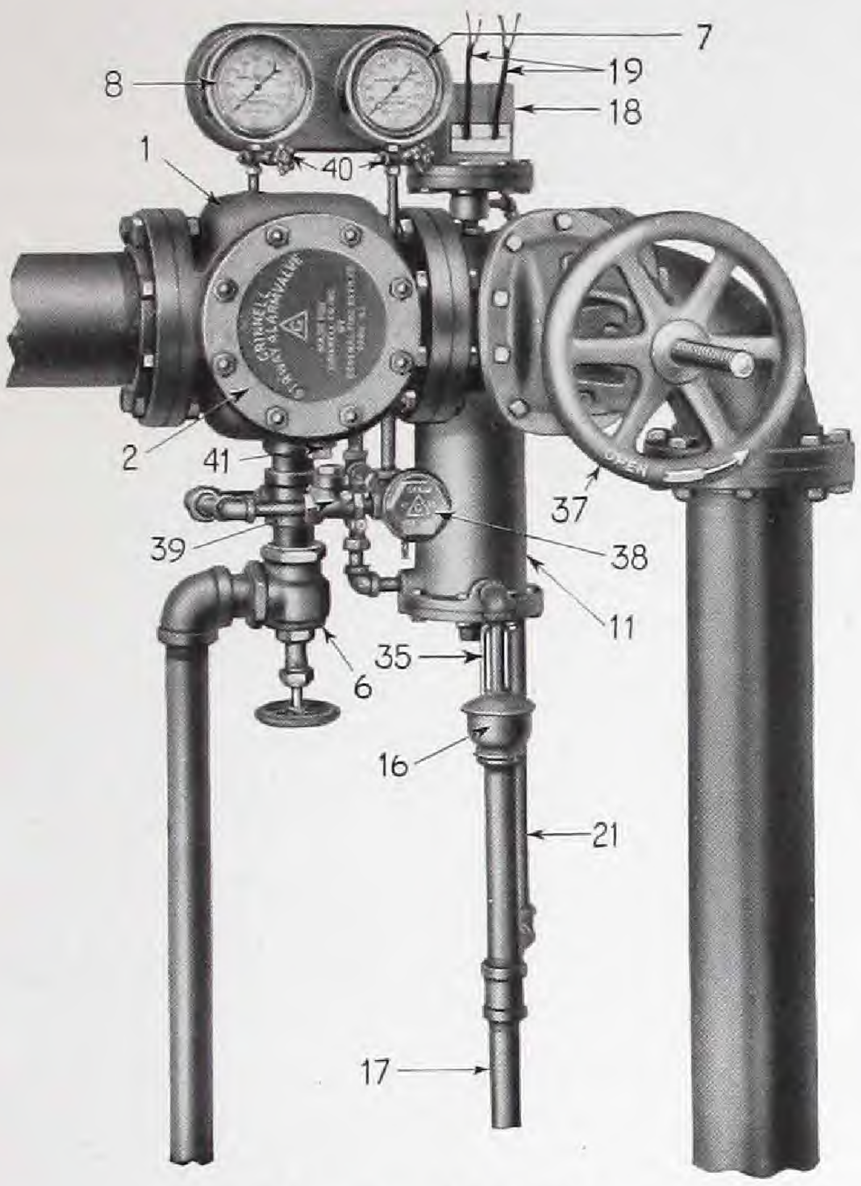


Fig. A—Horizontal

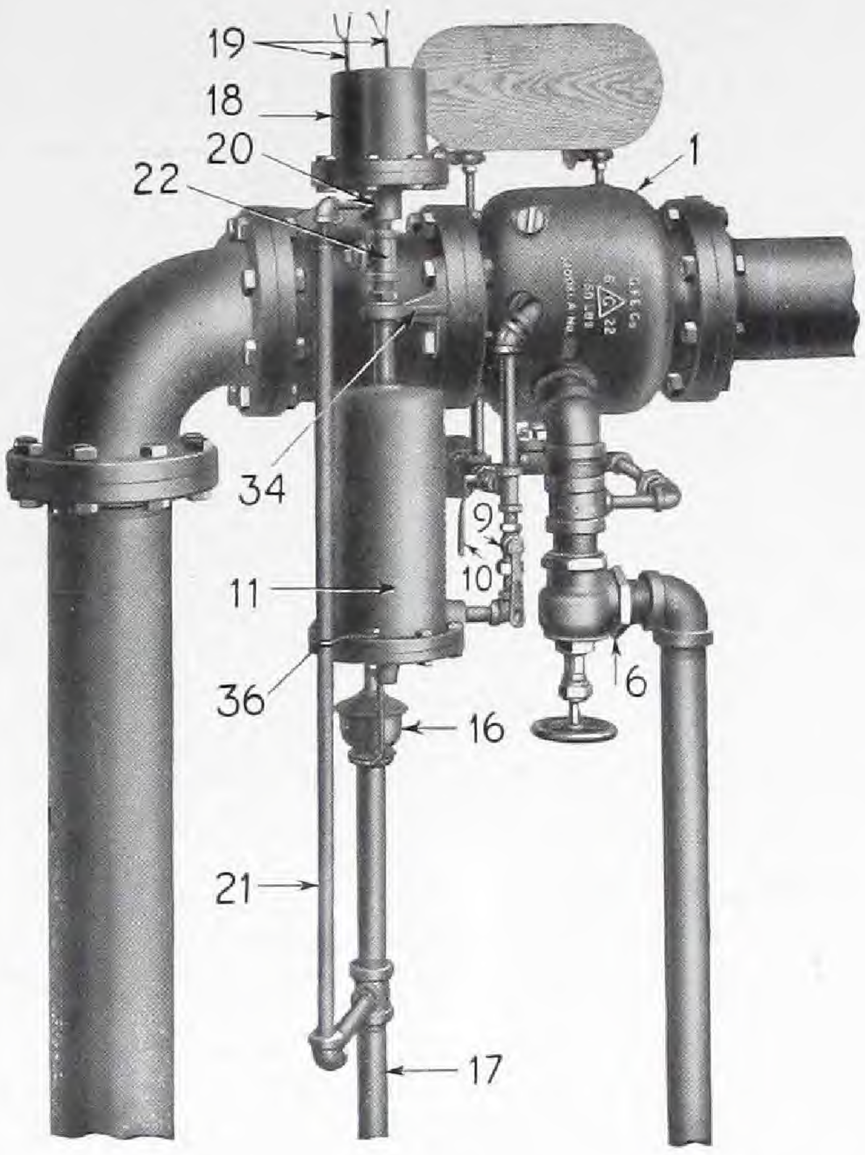


Fig. B—Horizontal

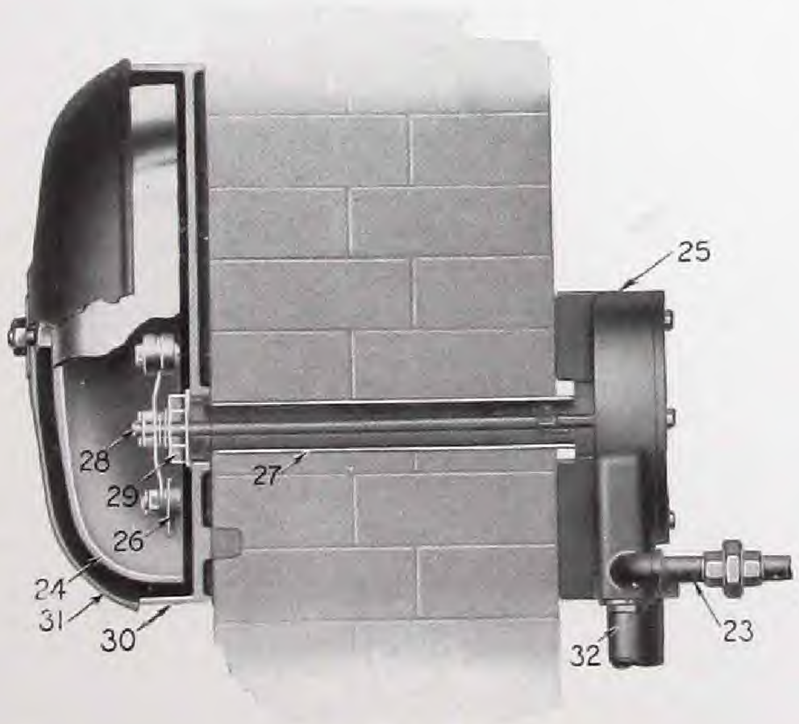


Fig. E

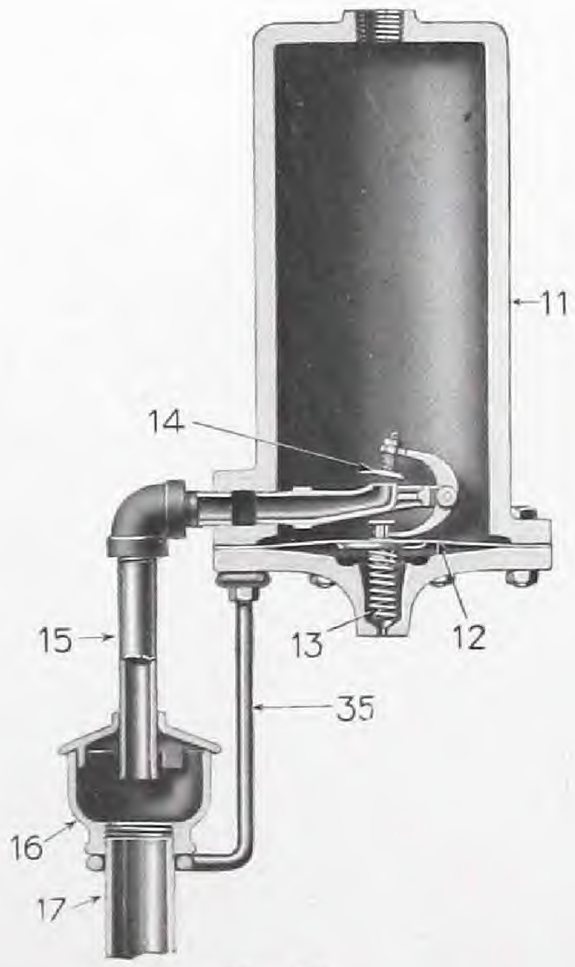


Fig. F

When ordering parts of the Grinnell Alarm Valve, Model "A," for replacement, be sure to indicate Page Number, Article Number and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell Alarm Valve, Model "A"

Various Parts of Valve and Alarms

(See Illustrations on pages 44 and 45)

1—(Figs. A, B, C, D) Alarm Valve which can be installed either in a vertical or a horizontal position.

2—(Figs. A, D) Removable Cover which allows inspection or cleaning of inside of Alarm Valve.

3—(Figs. C, D) Alarm Valve Clapper.

4—(Figs. C, D) Special Renewable Rubber Clapper Facing.

5—(Fig. D) Opening in the Valve Seat which allows water to pass through Cock 9 into Retarding Chamber 11 only when the Clapper is raised from the Valve Seat.

6—(Fig. A) Main Draw-off Valve for draining the system.

7, 8—(Fig. A) Pressure Gauges, 7 showing the supply pressure below Alarm Valve Seat, 8 the system pressure above Seat.

9—(Figs. A, B) ½-inch Cock in pipe connecting Alarm Valve through Opening 5 with Retarding Chamber 11. Cock should be sealed open and closed only when necessary to shut off alarms.

10—(Figs. A, B) ½-inch Cock in Alarm Test Connection from below Alarm Valve Seat to Retarding Chamber 11 for testing the Alarms. Cock 10 should be kept closed.

11—(Figs. A, B, F) Retarding Chamber.

12—(Fig. F) Flexible Metal Diaphragm which is forced downward by the pressure of water when Alarm Valve Clapper 3 raises or Test Cock 10 is opened, this acting through rocker arm closes Valve 14.

13—(Fig. F) Spring which forces Diaphragm 12 up and opens Valve 14.

14—(Fig. F) Valve which is automatically closed when Alarm Valve Clapper 3 raises or Test Cock 10 is opened, thus preventing escape of water through Drip Pipe 15.

15—(Fig. F) ½-inch Drip Pipe which empties into Drip Receiver 16.

16—(Figs. A, B, F) Special funnel shaped Drip Receiver with a removable cover.

17—(Figs. A, B, F) 1¼-inch Pipe for draining discharge from Pipes 15 and 21.

18—(Figs. A, B) Electric Alarm Circuit Closer.

19—(Figs. A, B) Wires for connecting Circuit Closer 18 with the Electric Gong and Battery; also with the test switch when required.

20—(Fig. B) ¼-inch Bronze Vent Bushing in Circuit Closer with ⅛-inch drilled hole to automatically vent the alarm piping after testing Alarms or after shutting off Alarms. This is to be plugged when Water Motor is used.

21—(Figs. A, B) ¾-inch Drip Pipe from Vent Bushing 20 to Drip Pipe 17. This is used only when Water Motor is not installed.

22—(Figs. A, B) Tee with ¾-inch Outlet. Outlet to be plugged when Water Motor Alarm is not used.

23—(Fig. E) ¾-inch Galvanized Pipe Connecting Retarding Chamber 11 with Water Motor 25 through Tee 22.

24—(Fig. E) Alarm Gong.

25—(Fig. E) Water Motor operating Alarm Gong.

26—(Fig. E) Gong Striker.

27, 28, 29—(Fig. E) Connecting Parts to Water Motor Alarm Gong.

30—(Fig. E) Gong Frame.

31—(Fig. E) Cast Iron Hood placed over Alarm Gong.

32—(Fig. E) 1½-inch Pipe for draining Water Motor.

33, 34, 35, 36—(Figs. A, B) Supports.

37—(Figs. A, B) Gate Valve which controls water supply to system. This Valve should be sealed open.

38—(Figs. A, B) Restriction Unit to prevent false alarms.

39—(Figs. A, B) Special Check Valve which prevents a reverse flow of water in the Restriction By-Pass Connection.

40—(Figs. A, B) ¼-inch Side Outlet Globe Valves which may be used for testing Pressure Gauges by closing, removing plug and attaching Test Gauge.

The Grinnell Alarm Valve, Model "A"

Instructions for Maintenance

In properly maintaining this Grinnell Alarm Valve two distinct sets of circumstances must be clearly held in mind, for conditions where there is a steady non-fluctuating pressure as, for instance, with a gravity tank or pressure tank are fundamentally different than where there is a varying pressure. Where the pressure on the system is non-fluctuating the pressure shown on the Gauges 7 and 8 in Fig. A would be practically the same.

Where there is a variation in the pressure of the primary supply to the sprinkler system there should be a higher pressure indicated on Gauge 8 than is indicated on Gauge 7. This differential would vary, as with any such variable pressure there should be an accumulated pressure confined on the system side of the valve.

The Drip 15 in Fig. F should always be free from leakage, except at such times as water hammer or severe fluctuations in pressure are enough to open the Main Valve 3, Figs. C and D, which opening allows water to pass into the system and build up excess pressure as noted above and also allows a certain amount of water to pass into the Retarding Chamber 11 through the passage 5, Fig. D. The water thus admitted into the Retarding Chamber 11 is automatically released and discharges to the drain through Pipe 17, Figs. A, B, and F, without giving any alarm.

If, however, instead of an intermittent and varying flow of water there is a continuous flow of water into the system, as would occur when a sprinkler opens, the Valve 3, Figs. C and D, will open and allow the water to flow into the Retarding Chamber in sufficient volume to sound both the electric and water motor alarms.

If there is on your system a varying water pressure as indicated earlier, and the Gauges 7 and 8, Fig. A, indicate the same pressure, it is a sign that either Valve 3 or Check Valve 39 is leaking. If a leak is occasioned by this or any other cause, the leak will be readily observed by raising cover of Receiver 16, Fig. F.

Leakage at the Valve 3 is usually caused by dirt or other foreign matter loading under the Valve 3, Figs. C and D, or in some cases it may be due to an injury to the Rubber Facing 4. In case of any leak at the Valve from whatever cause, the Gate Valve 37, Figs. A and B, should be closed, care being taken to notify the insurance interests of such closing and to station a man at the Valve until it is opened again. After the gate valve is closed the system can be drawn off by opening the Draw-off Valve 6, Figs. A and B. After properly drawing off the system the Cover 2, Fig. A, can be removed, which allows ready examination of the Bronze Disc 3. See that the valve is clean and free from any obstruction and also carefully examine the Rubber Facing 4 to find if it is in perfect condition. Make sure that Groove 5 in Valve Seat is clear. If leakage of Check Valve 39 is suspected, remove the cap, thoroughly clean the interior of the Check, and make certain that the special rubber faced clapper is free from any imperfections on the seating surface.

This proper cleaning and putting of Valve 3 and Check Valve 39 in working order will, if the system is tight, practically assure that with varying pressures an accumulated pressure will be set up on the system side of Valve 3, thus preventing false alarm. This building up of pressure on the system side of Valve 3 is facilitated by the use of the Restriction By-Pass including Restriction Unit 38, Figs. A and B, which allows a restricted flow of water to pass from the supply to the system side of the Alarm Valve Clapper, and Check Valve 39 which prevents the return flow of this water. In case false alarms continue it is a sign that the system is leaking somewhere else. The most common place to find such leaks would be in the Draw-off Valve 6 or in some pipe or sprinkler which has been injured, and it is important that such leakage be remedied that systems may be in proper working condition.

Water Motor and Electric Alarms

The Water Motor Alarm shown in Fig. E is, as above noted, made operative by a water flow and to be sure that you will get a prompt alarm in case of fire this water motor should be periodically examined, to see that it is in perfect working order. You should primarily examine this alarm to see that the Water Motor Shaft 28 and Striker 26, Fig. E, are perfectly free to revolve without undue pressure being exerted.

If you have an Electric Alarm connected with your sprinkler system it should be periodically tested to ascertain if it is in working order, and the batteries properly charged.

Alarms may be tested either by opening ¾" Inspector's Test Valve at top of system or by opening Valve 10 at the Alarm Valve. By using Valve 10, the Electric and Water Motor Alarms can be tested without disturbing the Alarm Valve Clapper. Test Valves should be closed after making test.

The Grinnell Dry-Pipe Valve, No. 12

Fig. 1

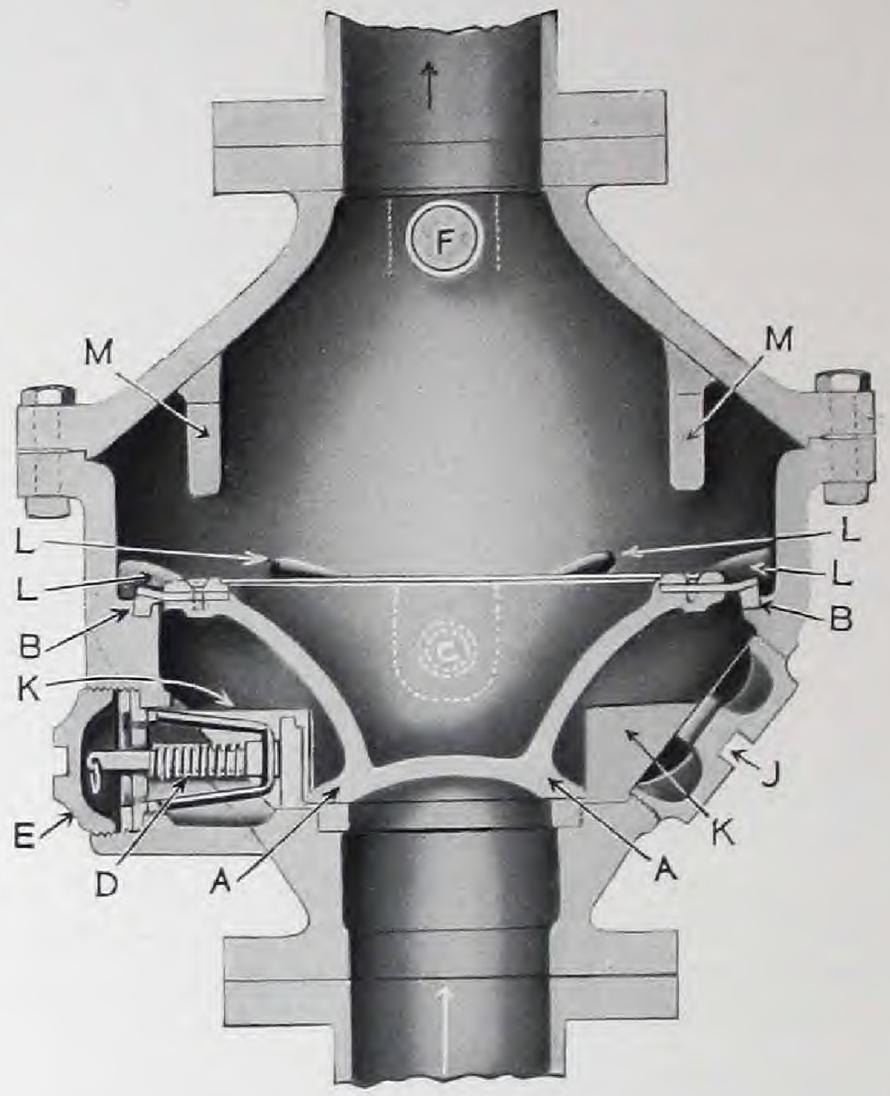


Fig. 2

Various Parts of Valve

A—(Fig. 2) Water Valve which closes the water inlet.

B—(Fig. 2) Air Valve, consisting of a Rubber Diaphragm on a block tin Seat.

C—(Figs. 1, 2) Drip Check Valve, so constructed that it allows any slight leakage of water past the Valve A to flow out through the Drip Pipe C, and is automatically closed by the pressure of water in the intermediate chamber between Valves A and B, when the Valve A opens.

D—(Fig. 2) Latch which prevents Valve A from closing by its own weight, or by water column in the sprinkler pipes after it has once opened.

E—(Fig. 1) Plug for access to Latch D.

F—(Figs. 1, 2) Draw-off Valve and Pipe for emptying the entire system of water after Dry-Pipe Valve has tripped.

G—(Fig. 1) Valve used for the purpose of ascertaining that the system of sprinklers and piping is free of water down to the level of the draw-off pipe.

H—(Fig. 1) Pressure Gauge to indicate the pressure of air in the sprinkler system.

I—(Fig. 1) Pipe which connects the intermediate chamber between Water Valve A and Air Valve B to an Electric Circuit Closer N. When the Valve A opens, the full water pressure enters through the pipe I to the Circuit Closer N, and the pressure upon a flexible diaphragm closes a circuit and sounds a continuous electric alarm. Or, the pipe I may be connected to a Water Motor Alarm described with other types of Dry-Pipe Valves.

J—(Figs. 1, 2) Hand-Hole Plug for access to Valves A and B.

KK—(Fig. 2) Guides for Valve A.

LLLL—(Fig. 2) Guides for Valve B.

MM—(Fig. 2) Stops to limit the upward movement of Valve A.

N—(Fig. 1) Electric Alarm Circuit Closer.

Manufacture of this type of Dry-Pipe Valve has been discontinued. We can no longer furnish replacement Valves of this type, make repairs, or furnish repair parts of the Valve with the exception of the Rubber Diaphragm B. (When ordering, specify Size of Valve.)

We recommend that all these old Valves be replaced with the modern approved Grinnell Dry-Pipe Valve, Model "E," in which case a liberal allowance will be made on the return of the old Valve to one of our plants (charges prepaid).

When ordering Rubber Diaphragms for the Grinnell Dry-Pipe Valve No. 12 for replacement be sure to indicate Page Number, Article Letter and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell Dry-Pipe Valve, No. 12

Instructions for Maintenance

Never Apply Grease, Tallow or Any Oily Substance to the Valve Seats A or B, Figure 2

The chief problem in maintaining a Dry-Pipe System is the keeping up of the proper air pressure in relation to the water pressure supplying the system.

The following table of air and water pressures is a safe guide to follow in practice:

WATER PRESSURE	AIR PRESSURE	
Maximum	Not less than	Not more than
50 lbs.	15 lbs.	25 lbs.
75 "	20 "	30 "
100 "	25 "	35 "
150 "	35 "	50 "

If air pressure is kept on the system according to the foregoing table there will be no difficulty experienced in preventing the Dry-Pipe Valve from tripping unnecessarily.

In case, however, water either through accident or through the operation of sprinklers in a fire, should get into the dry side of the system, the system should be emptied and the Valve reset as follows: Close the main Gate Valve in the supply pipe, after notifying the Insurance Interests that same is to be closed, and after stationing a man at the Valve until it is reopened. Then open the Draw-off Valve "F," figure 1, and do not close it until water has ceased to run. Then open Drain Valves and Vents throughout the system.

When the system has been drawn off according to the foregoing directions, shut all Drain Valves and Vents, and then take out the Hand-Hold Plugs "J" in the body of the Dry-Pipe Valve and open Valve "A" wide.

Then wipe perfectly clean the faces and the seats of the Valves "A" and "B." It is essential to see that the Valves are scrupulously clean, as any foreign matter will cause leakage.

When the Valves have thus been cleaned, the main Gate Valve should be opened a trifle so that water can come up to the level of Valve Seat "A," Figure 2. When this has been done, the main Gate Valve should again be closed, after which the Valves "A" and "B" are closed by disengaging the Latch "D," care being taken to see that the Valve "A" is let down easily onto its seat, so that it will not be injured.

Pull out the Latch "D" and hold it out by placing a rod through the ring at the end of the Latch. Then hold the Valve "A" firmly to its seat and fill the Dry-Pipe Valve Body with water above the Valve "B," doing this by means of Valve "G," Figure 1, through the priming cup shown just above Valve "G." Then close Valve "G" and pump up a few pounds of air pressure.

A few pounds of air pressure will force any water remaining in the system to the low points, after which the Drain Valves should be slightly opened, each one separately and this water drawn off. Close all Drain Valves and pump up air pressure according to the above table.

After the air pressure has been properly pumped up and there is no sign of leakage through Valves "A" and "B," remove the rod from the ring of the Latch "D" and see that the Latch is free to move back against Valve "A." Then open the main Gate Valve wide and by means of the Hand-Holes, see if Valves "A" and "B" are tight. If no leaks are found, screw Plugs in tight.

As it often happens that water may still settle to the low points of the system from condensation, it is well to repeat the pumping up of a little air pressure, and the separate opening of Drain Valves occasionally to expel such accumulation.

Be Sure that your Air Compressor is Always in Good Working Order.

Inspection

1st. Open Valve "G" slightly to see that the system of sprinklers and piping is free of water down to the level of the Draw-off Valve and Pipe "F." If any water appears, draw it off through petcock, and then tightly close Valve "G."

2d. Unscrew the Hand-Hole Plugs "J" and see that the Water Valve "A" and the Air Valve "B" are tight. This is accomplished by simply looking in at the hand-hole openings.

3d. Unscrew Plug "E," for access to Latch "D." Pull the ring to ascertain that the Latch is free to move and that the spring has a strong inward thrust.

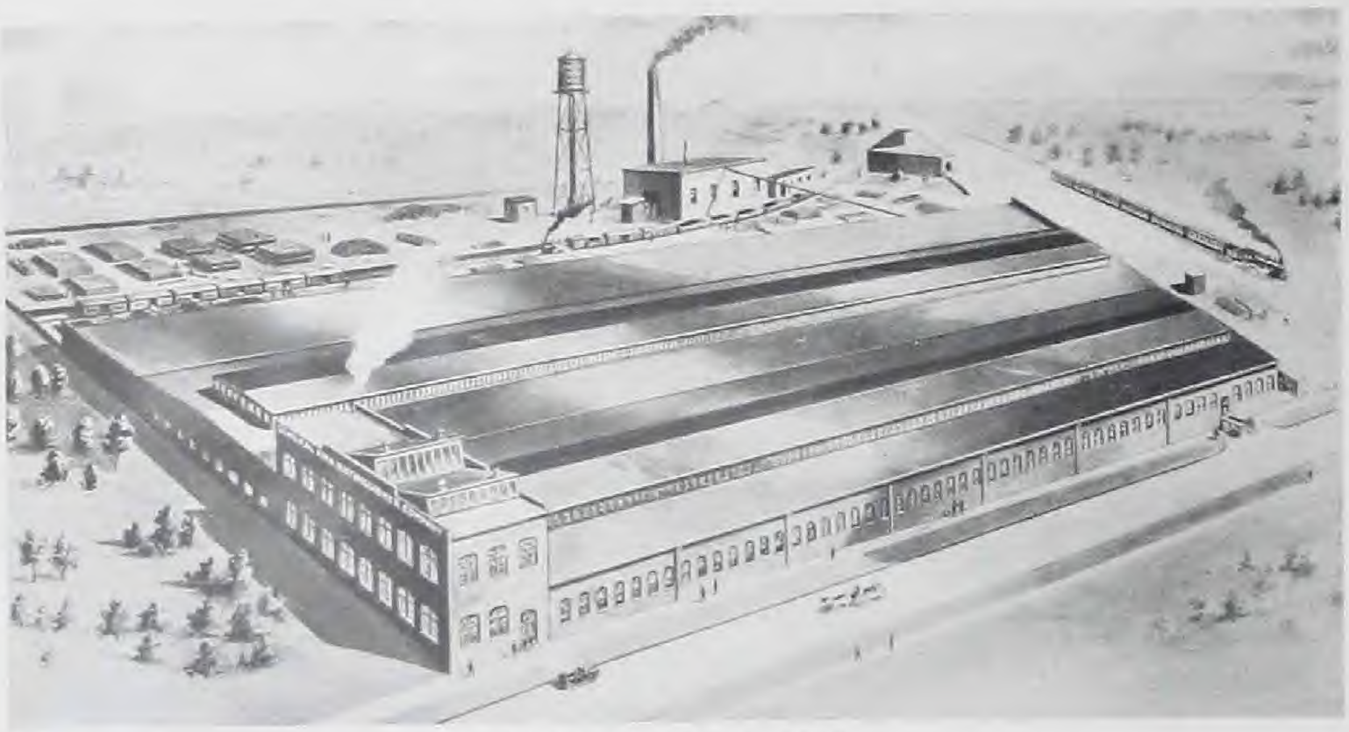
4th. Screw Plugs "J" and "E" in tight.

After making the above examination there is nothing more for an inspector to do; and it follows that as far as the Grinnell Dry-Pipe Valve is concerned, the system is in perfect working order.

These Illustrations Will Give Some Idea of the Facilities of Grinnell Com

Plant and Foundry at Auburn, R. I.

Plant and Fo



Plant at Charlotte, N. C.

Pla

Pipe Shop at Warren, Ohio.

Foundry at Toronto, Ont.

Soldering Sp

View of a Pipe Bending Department

Views of Experimen

y Through Its Arrangements with the General Fire Extinguisher Company

at Providence, R. I.

Plant and Foundry at Warren, Ohio.

hicago, Ill.

Plant and Foundry at Atlanta, Ga.

at Providence, R. I.

Plant at Montreal, P. Q.

Pipe Storage at Auburn, R. I.

oratories at Providence, R. I.

Section of a Foundry Moulding Floor

The Grinnell (2-inch) Dry-Pipe Valve, No. 13

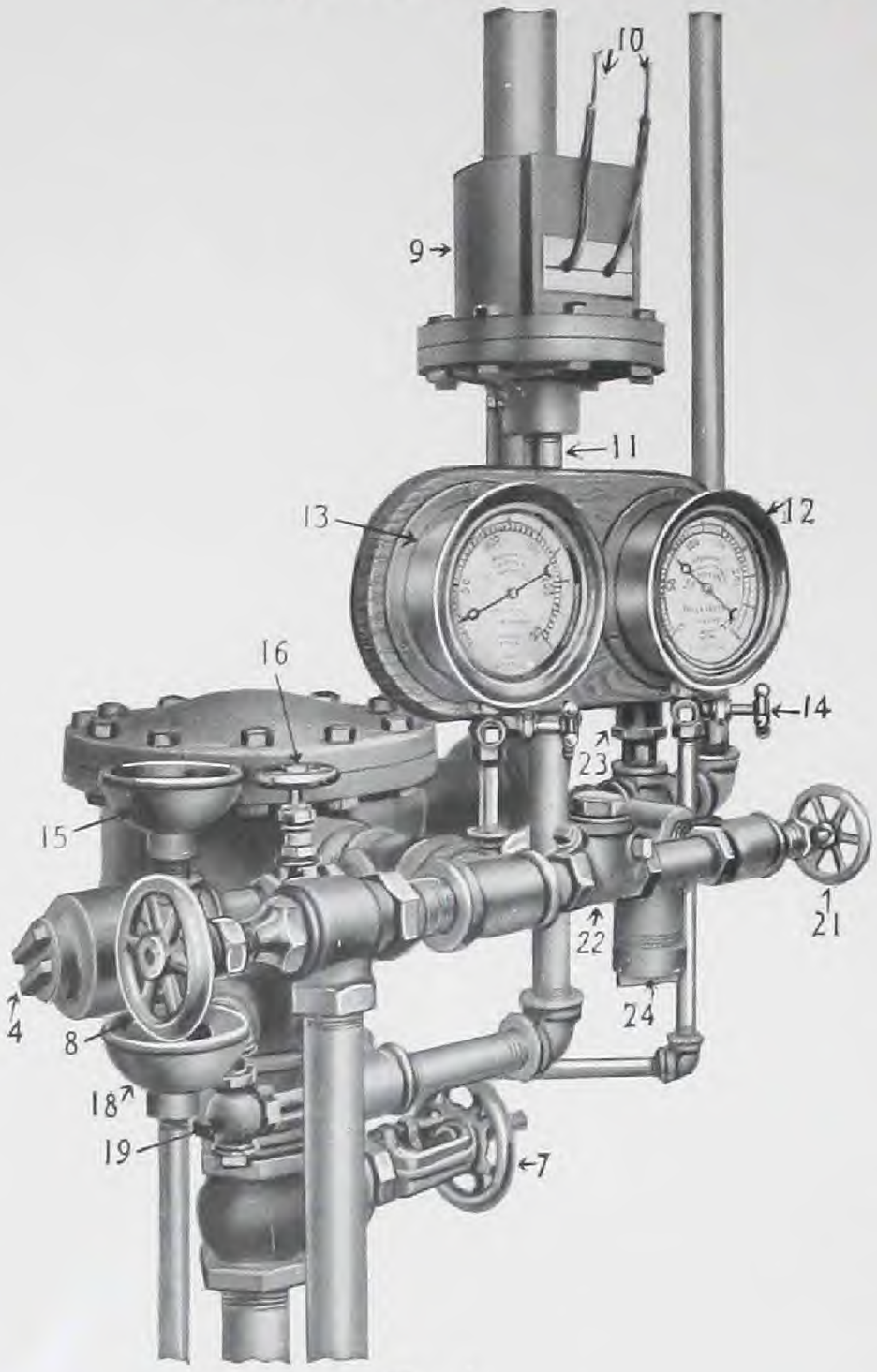


Fig. A.

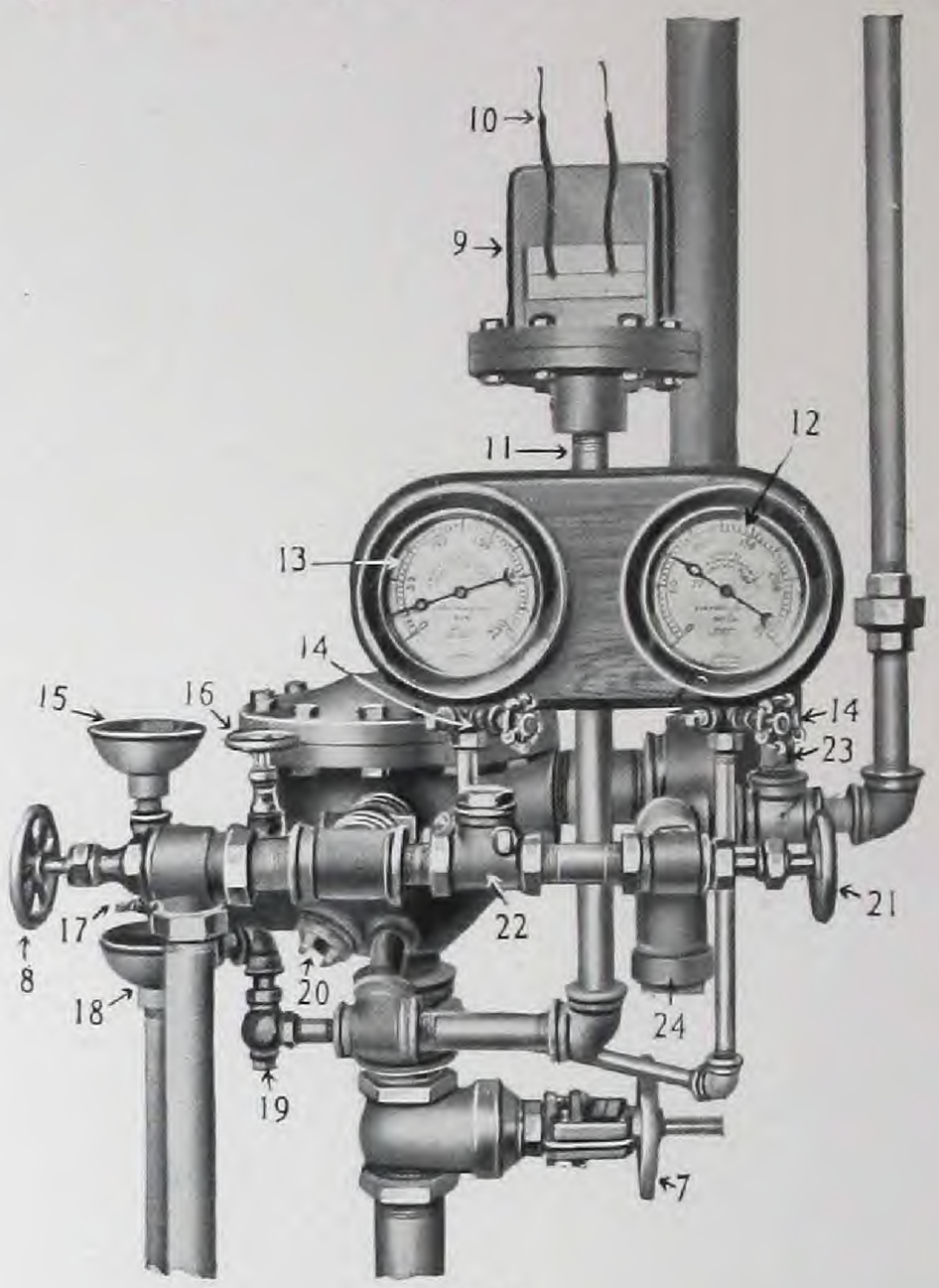


Fig. B.

Various Parts

1—(Fig. C) Water Valve which closes the water inlet.

2—(Fig. C) Air Valve consisting of a Rubber Diaphragm on a block tin Seat.

3—(Fig. C) Latch which prevents Valve 1 from closing by its own weight or by water column in the sprinkler pipes, after it has once opened.

4—(Figs. A, C) Plug for access to the Latch 3.

5—(Fig. C) Spindle which limits the movement of the Valve casting.

6—(Fig. C) Cover to be removed in cleaning the Valve.

7—(Figs. A, B) 2″ O. S. & Y. Gate Valve controlling water supply to system.

8—(Figs. A, B) 1″ Draw-off Valve and Pipe for emptying entire system of water after valve has tripped.

9—(Figs. A, B) Electric Alarm Circuit Closer.

10—(Figs. A, B) Wires for connecting the Circuit Closer 9 with the Electric Gong and Electric Battery.

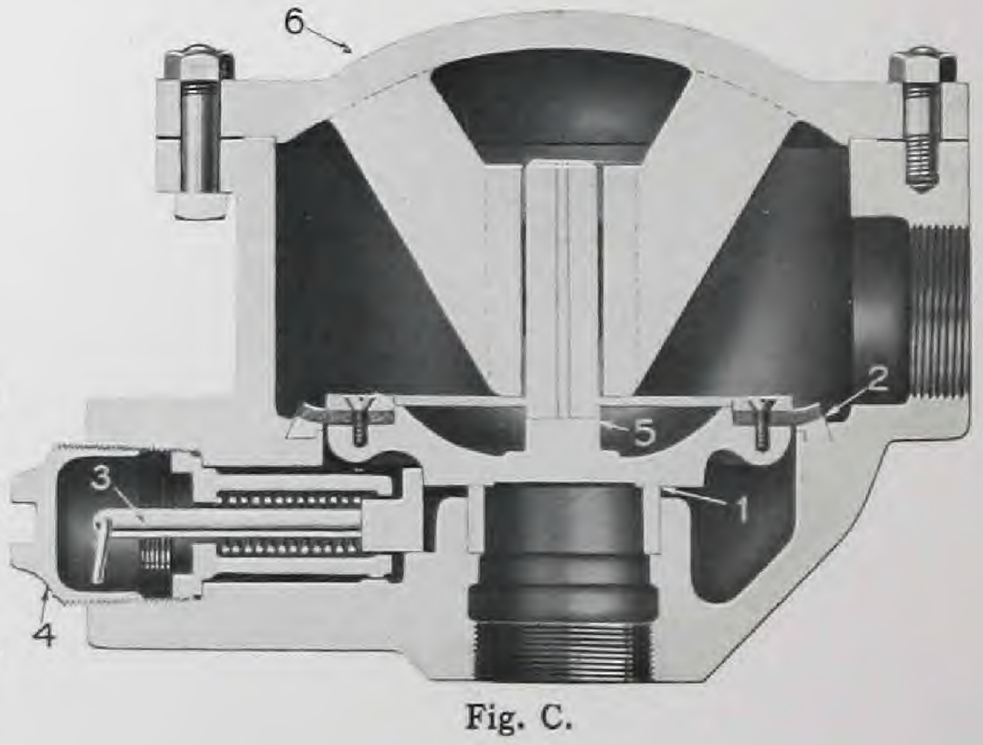


Fig. C.

11—(Figs. A, B) ¾″ Galvanized Pipe which connects the intermediate chamber of the Dry-Pipe Valve body with the Electric Circuit Closer 9. When the Dry-Pipe Valve operates the full water pressure enters into the Pipe 11 to the Electric Circuit Closer 9 and the pressure upon a flexible metal diaphragm closes the electric circuit and sounds a continuous electric alarm.

Manufacture of this Type of Dry-Pipe Valve has been discontinued. We can no longer furnish replacement Valves of this type, make repairs, or furnish repair parts of the Valve with the exception of the Rubber Diaphragm 2.

When ordering parts of the Grinnell (2-inch) Dry-Pipe Valve No. 13 for replacement be sure to indicate Page Number, Article Number and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell (2-inch) Dry-Pipe Valve, No. 13

Various Parts (Continued)

12—(Figs. A, B) Pressure Gauge to indicate pressure of water in the supply pipe.

13—(Figs. A, B) Pressure Gauge to indicate pressure of air in the sprinkler system.

14—(Figs. A, B) ¼" Side Outlet Globe Valves which may be closed and used for testing the Pressure Gauges by removing the plugs and attaching test gauges.

15—(Figs. A, B) Funnel for priming Dry-Pipe Valve.

16—(Figs. A, B) ⅜" Valve to be opened while priming Dry-Pipe Valve but closed at other times except when used to see that the system is free from water down to the level of the air piping.

17—(Fig. B) ¼" Cock to drain surplus water from priming funnel.

18—(Figs. A, B) Drain Cup and Pipe.

19—(Figs. A, B) ⅜" Check Valve so constructed that it allows any slight leakage of water past Valve 1 to flow out into Drain Pipe 18 but closes automatically by the pressure of water in the intermediate chamber between Valves 1 and 2 when the Dry-Pipe Valve operates.

20—(Fig. B) Plug for access to intermediate chamber to see that Seats 1 and 2 are not leaking.

21—(Figs. A, B) ¾" Angle Valve controlling air supply from air compressor.

22—(Figs. A, B) ¾" Check Valve to hold air in system while air is being pumped in.

23—(Figs. A, B) ¾" Brass Relief Valve in the connection from Air Compressor to avoid the possibility of creating too great an air pressure on top of Dry-Pipe Valve. This Relief Valve is normally set at 40 pounds air pressure when water pressure does not exceed 100 pounds.

24—(Figs. A, B) ¾" Sediment Strainer to prevent scale or other foreign matter from being carried into the Dry-Pipe Valve and injuring the Seats 1 and 2.

Instructions for Maintenance

The chief problem in maintaining a dry-pipe system is the keeping of the proper air pressure in relation to the water pressure supplying the system. The construction of this Dry-Pipe Valve is such that one pound of air pressure will hold back approximately six pounds of water pressure. In practice, the relation between water and air pressure should be maintained according to the following table:

Maximum Water Pressure	Air Pressure	
	Not Less Than	Not More Than
50 lbs.	15 lbs.	25 lbs.
75 "	20 "	30 "
100 "	25 "	35 "
125 "	30 "	45 "
150 "	35 "	50 "

If air pressure is kept on the system according to the foregoing table, there will be no difficulty experienced in preventing the Dry-Pipe Valve from tripping unnecessarily, providing the system is tight.

In case, however, water either through accident or the operation of sprinklers in a fire, should get into the dry part of the equipment, the system should be emptied as follows:

1—Close Main Gate Valve 7 in Supply Pipe under Dry-Pipe Valve after notifying the insurance interests.

2—Open Draw-off Valve 8, closing it when water has ceased to run.

3—Open Drain and Vent Valves throughout the system, closing them when water has ceased to run.

4—Remove Cover 6 and Plug 4 and lift out Valve Casting by Spindle 5. With a piece of clean waste carefully clean the face and seat of Valves 1 and 2.

5—Open Main Gate Valve 7 a little and let water come up to the seat of Valve 1.

6—Close Main Gate Valve 7 and replace valve casting and Cover 6. Pull out Latch 3 by means of the ring in the end which will allow the Valve Casting to seat tightly at 1 and 2. Hold the Latch out by placing a rod through the ring.

7—Open Valve 16.

8—With the Valve on its seats and the Latch 3 pulled out fill the Dry-Pipe Valve body above the Seat 2 with water up to the level of the Draw-off Pipe by means of the Funnel 15 and Valve 16. Open Pet Cock 17 to draw off any surplus water. Close Valves 16 and 8 and release Latch.

9—Open Valve 21 and pump up a few pounds of air pressure on the system.

10—Partially open Drain and Vent Valves separately (Drain Valves to be opened first) to force water from the low points of the system, closing them when water ceases to run.

11—Pump sufficient air into the sprinkler system to hold the Dry-Pipe Valve closed against the water pressure in the supply pipe. Close Valve 21.

12—Pull the Latch 3 by means of the ring in the end and see that it is free to move. Open Main Gate Valve 7 slowly. Remove Plug 20, see if Valves 1 and 2 are tight.

13—If no leaks are found screw Plugs 4 and 20 in tight and open wide Valve 7.

IN SETTING THE VALVE BE SURE NEVER TO APPLY GREASE, TALLOW OR ANY OILY SUBSTANCE TO VALVE SEATS 1 AND 2.

Caution: As water from condensation may settle at the low points of the system it will be prudent to occasionally open Valve 16, and other Drain Valves throughout the system, and if water appears draw it off, closing the Valves tight as soon as water ceases to run.

INSPECTION: First: Open Valve 16 and Cock 17 to see that the system of sprinklers and piping is free of water down to this level. If any water appears, draw if off and then tightly close Valve 16 and Cock 17.

Second: Unscrew the Hand-Hole Plug 20 and see that Water Valve 1 and Air Valve 2 are tight. This is accomplished by simply looking in at the Hand-Hole.

Third: Unscrew the Plug 4 for access to Latch 3. Pull the ring to ascertain that the Latch is free to move and has a strong inward thrust. After making the above examination there is nothing more for an inspector to do and it follows that, as far as the Grinnell Dry-Pipe Valve is concerned, the system is in perfect working order.

Be Sure that your Air Compressor is Always in Good Working Order.

The Grinnell (2-inch) Dry-Pipe Valve, No. 13

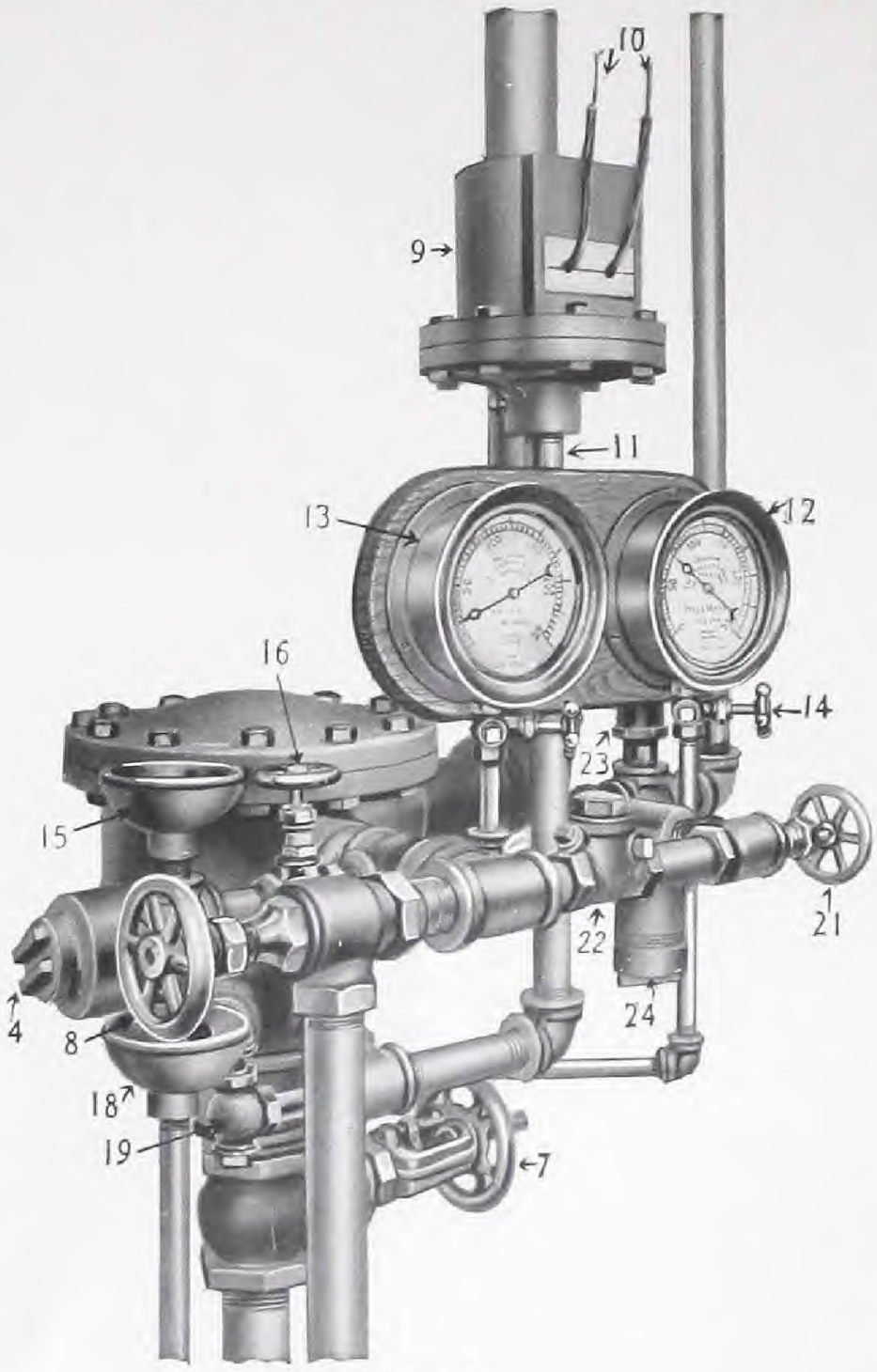


Fig. A.

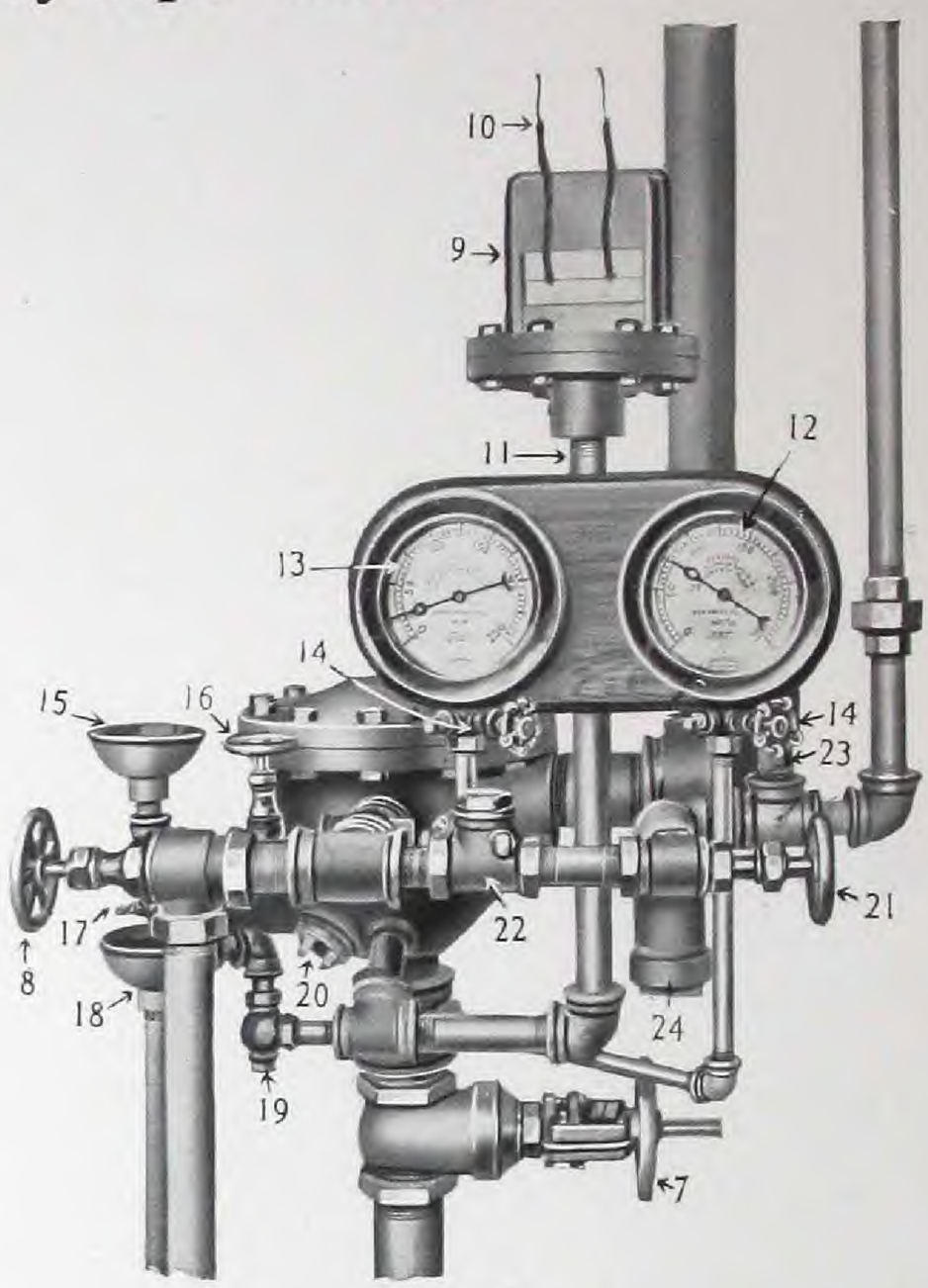


Fig. B.

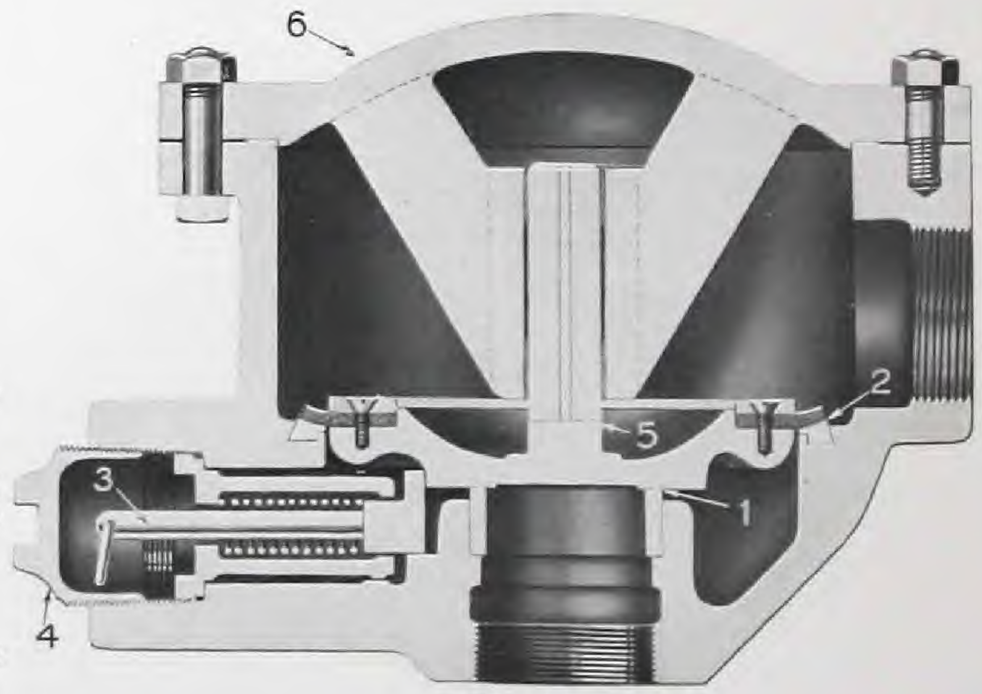


Fig. C.

Various Parts

1—(Fig. C) Water Valve which closes the water inlet.

2—(Fig. C) Air Valve consisting of a Rubber Diaphragm on a block tin Seat.

3—(Fig. C) Latch which prevents Valve 1 from closing by its own weight or by water column in the sprinkler pipes, after it has once opened.

4—(Figs. A, C) Plug for access to the Latch 3.

5—(Fig. C) Spindle which limits the movement of the Valve casting.

6—(Fig. C) Cover to be removed in cleaning the Valve.

7—(Figs. A, B) 2″ O. S. & Y. Gate Valve controlling water supply to system.

8—(Figs. A, B) 1″ Draw-off Valve and Pipe for emptying entire system of water after valve has tripped.

9—(Figs. A, B) Electric Alarm Circuit Closer.

10—(Figs. A, B) Wires for connecting the Circuit Closer 9 with the Electric Gong and Electric Battery.

11—(Figs. A, B) ¾″ Galvanized Pipe which connects the intermediate chamber of the Dry-Pipe Valve body with the Electric Circuit Closer 9. When the Dry-Pipe Valve operates the full water pressure enters into the Pipe 11 to the Electric Circuit Closer 9 and the pressure upon a flexible metal diaphragm closes the electric circuit and sounds a continuous electric alarm.

Manufacture of this Type of Dry-Pipe Valve has been discontinued. We can no longer furnish replacement Valves of this type, make repairs, or furnish repair parts of the Valve with the exception of the Rubber Diaphragm 2.

When ordering parts of the Grinnell (2-inch) Dry-Pipe Valve No. 13 for replacement be sure to indicate Page Number, Article Number and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell (2-inch) Dry-Pipe Valve, No. 13

Various Parts (Continued)

12—(Figs. A, B) Pressure Gauge to indicate pressure of water in the supply pipe.

13—(Figs. A, B) Pressure Gauge to indicate pressure of air in the sprinkler system.

14—(Figs. A, B) ¼" Side Outlet Globe Valves which may be closed and used for testing the Pressure Gauges by removing the plugs and attaching test gauges.

15—(Figs. A, B) Funnel for priming Dry-Pipe Valve.

16—(Figs. A, B) ⅜" Valve to be opened while priming Dry-Pipe Valve but closed at other times except when used to see that the system is free from water down to the level of the air piping.

17—(Fig. B) ¼" Cock to drain surplus water from priming funnel.

18—(Figs. A, B) Drain Cup and Pipe.

19—(Figs. A, B) ⅜" Check Valve so constructed that it allows any slight leakage of water past Valve 1 to flow out into Drain Pipe 18 but closes automatically by the pressure of water in the intermediate chamber between Valves 1 and 2 when the Dry-Pipe Valve operates.

20—(Fig. B) Plug for access to intermediate chamber to see that Seats 1 and 2 are not leaking.

21—(Figs. A, B) ¾" Angle Valve controlling air supply from air compressor.

22—(Figs. A, B) ¾" Check Valve to hold air in system while air is being pumped in.

23—(Figs. A, B) ¾" Brass Relief Valve in the connection from Air Compressor to avoid the possibility of creating too great an air pressure on top of Dry-Pipe Valve. This Relief Valve is normally set at 40 pounds air pressure when water pressure does not exceed 100 pounds.

24—(Figs. A, B) ¾" Sediment Strainer to prevent scale or other foreign matter from being carried into the Dry-Pipe Valve and injuring the Seats 1 and 2.

Instructions for Maintenance

The chief problem in maintaining a dry-pipe system is the keeping of the proper air pressure in relation to the water pressure supplying the system. The construction of this Dry-Pipe Valve is such that one pound of air pressure will hold back approximately six pounds of water pressure. In practice, the relation between water and air pressure should be maintained according to the following table:

Maximum Water Pressure	Air Pressure	
	Not Less Than	Not More Than
50 lbs.	15 lbs.	25 lbs.
75 "	20 "	30 "
100 "	25 "	35 "
125 "	30 "	45 "
150 "	35 "	50 "

If air pressure is kept on the system according to the foregoing table, there will be no difficulty experienced in preventing the Dry-Pipe Valve from tripping unnecessarily, providing the system is tight.

In case, however, water either through accident or the operation of sprinklers in a fire, should get into the dry part of the equipment, the system should be emptied as follows:

1—Close Main Gate Valve 7 in Supply Pipe under Dry-Pipe Valve after notifying the insurance interests.

2—Open Draw-off Valve 8, closing it when water has ceased to run.

3—Open Drain and Vent Valves throughout the system, closing them when water has ceased to run.

4—Remove Cover 6 and Plug 4 and lift out Valve Casting by Spindle 5. With a piece of clean waste carefully clean the face and seat of Valves 1 and 2.

5—Open Main Gate Valve 7 a little and let water come up to the seat of Valve 1.

6—Close Main Gate Valve 7 and replace valve casting and Cover 6. Pull out Latch 3 by means of the ring in the end which will allow the Valve Casting to seat tightly at 1 and 2. Hold the Latch out by placing a rod through the ring.

7—Open Valve 16.

8—With the Valve on its seats and the Latch 3 pulled out fill the Dry-Pipe Valve body above the Seat 2 with water up to the level of the Draw-off Pipe by means of the Funnel 15 and Valve 16. Open Pet Cock 17 to draw off any surplus water. Close Valves 16 and 8 and release Latch.

9—Open Valve 21 and pump up a few pounds of air pressure on the system.

10—Partially open Drain and Vent Valves separately (Drain Valves to be opened first) to force water from the low points of the system, closing them when water ceases to run.

11—Pump sufficient air into the sprinkler system to hold the Dry-Pipe Valve closed against the water pressure in the supply pipe. Close Valve 21.

12—Pull the Latch 3 by means of the ring in the end and see that it is free to move. Open Main Gate Valve 7 slowly. Remove Plug 20, see if Valves 1 and 2 are tight.

13—If no leaks are found screw Plugs 4 and 20 in tight and open wide Valve 7.

IN SETTING THE VALVE BE SURE NEVER TO APPLY GREASE, TALLOW OR ANY OILY SUBSTANCE TO VALVE SEATS 1 AND 2.

Caution: As water from condensation may settle at the low points of the system it will be prudent to occasionally open Valve 16, and other Drain Valves throughout the system, and if water appears draw it off, closing the Valves tight as soon as water ceases to run.

INSPECTION: First: Open Valve 16 and Cock 17 to see that the system of sprinklers and piping is free of water down to this level. If any water appears, draw if off and then tightly close Valve 16 and Cock 17.

Second: Unscrew the Hand-Hole Plug 20 and see that Water Valve 1 and Air Valve 2 are tight. This is accomplished by simply looking in at the Hand-Hole.

Third: Unscrew the Plug 4 for access to Latch 3. Pull the ring to ascertain that the Latch is free to move and has a strong inward thrust. After making the above examination there is nothing more for an inspector to do and it follows that, as far as the Grinnell Dry-Pipe Valve is concerned, the system is in perfect working order.

Be Sure that your Air Compressor is Always in Good Working Order.

The Grinnell Straightway Dry-Pipe Valve, Type "B"

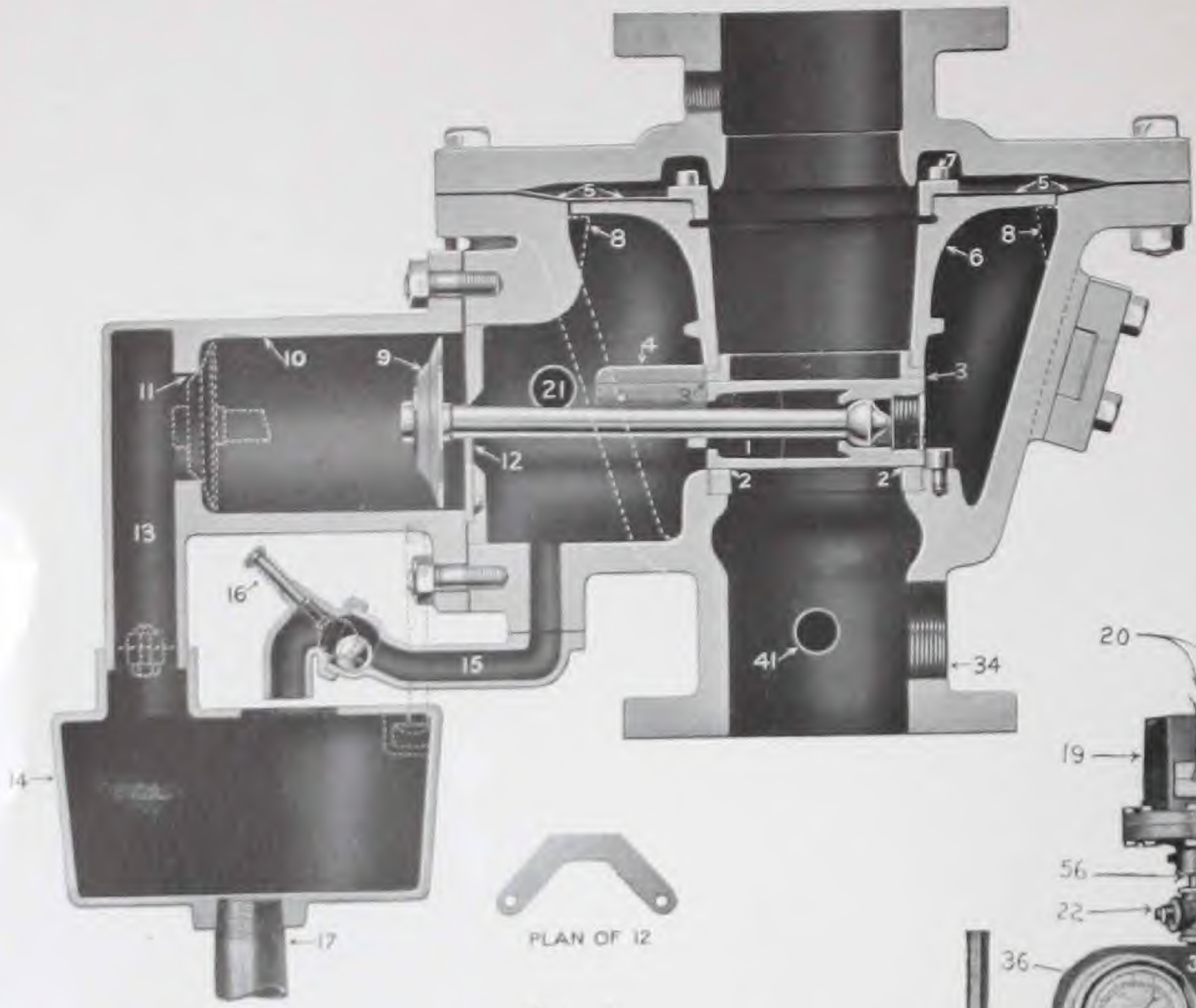


Fig. A

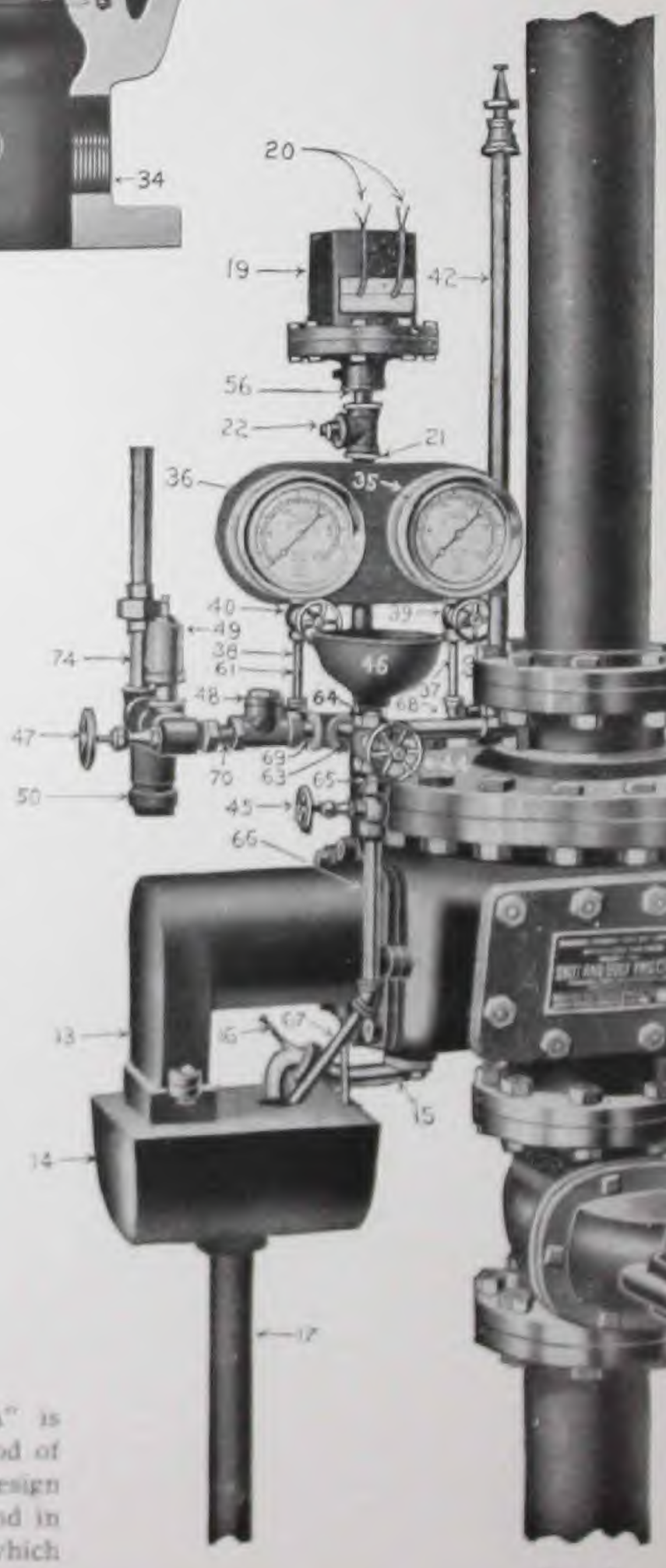


Fig. B

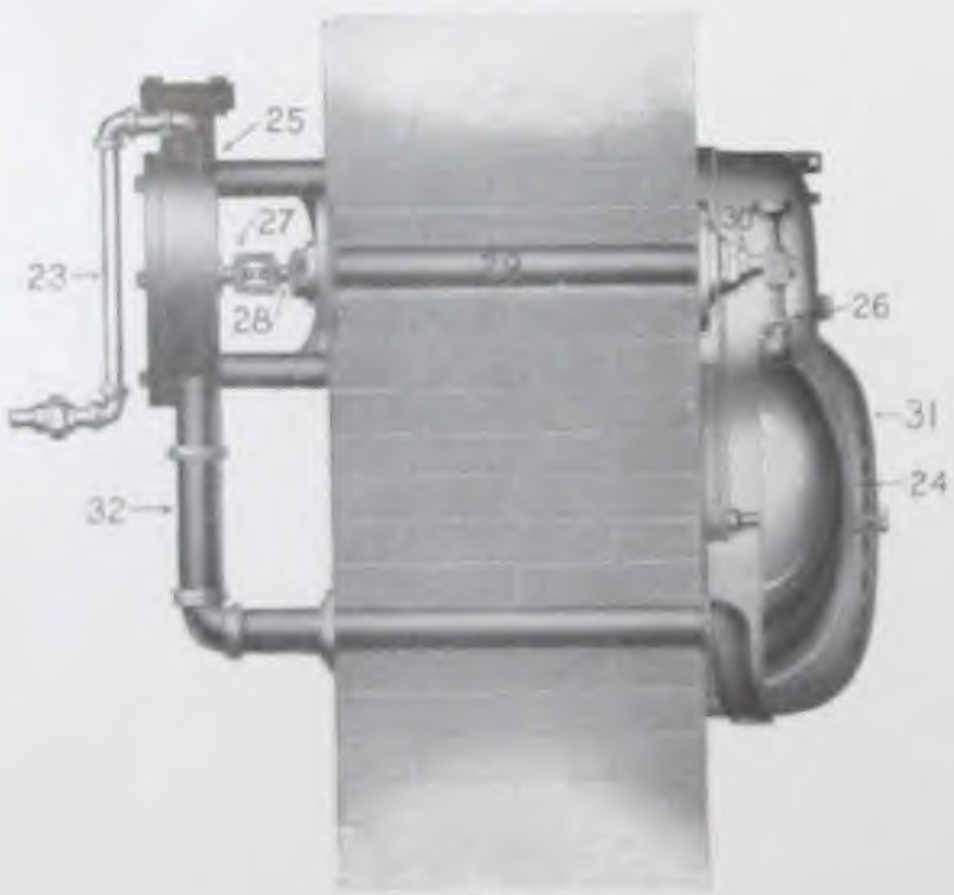


Fig. E

Note:—The Grinnell Straightway Dry-Pipe Valve, Type "A" is identical with the Type "B" Valve in general design, method of operation and in maintenance. The principal differences in design are in Cylinder 10, Drip Receiver 14, Ball Check Valve 15, and in the lengths of the upper and lower necks of the Valve Body, which lengths are reversed.

The Grinnell Straightway Dry-Pipe Valve, Type "B"

Various Parts Valve and Alarms

1—(Fig. A) Round metal Gate which closes the waterway.

2—(Fig. A) Water Seat of Gate 1.

3—(Fig. A) Air Seat of Gate 1.

4—(Fig. A) Guides which limit the upward movement of Gate 1.

5—(Fig. A) Flexible metal Diaphragm which is clamped between the two parts of the Valve Body.

6—(Fig. A) Air Valve Casting carried by the Diaphragm 5.

7—(Fig. A) Stops on Casting 6 which, by coming into contact with the upper part of Valve Body, limit the upward movement of Casting 6.

8—(Fig. A) Stops to support Casting 6 after Gate 1 is withdrawn.

9—(Fig. A) Piston which draws Gate 1 from the waterway when Valve operates. It fits loosely in the copper and tin plated Cylinder 10.

10—(Fig. A) Copper and tin plated Cylinder.

11—(Fig. A) Vent to allow the escape from the Cylinder 10 of any water that may pass the Piston 9. It is automatically closed by the Piston 9 when Valve operates, as indicated by dotted lines.

12—(Fig. A) Support for rod of Piston 9 to keep the Piston 9 from bearing in the Cylinder 10.

13—(Figs. A, B, C, D) Discharge from Vent 11 to Drip Receiver 14, so designed as to prevent obstructions from entering the Cylinder 10.

14—(Figs. A, B, C, D) Drip Receiver.

15—(Figs. A, B, C, D) Ball Check Valve, so constructed that it allows any slight leakage of water past Seat 2 to flow out into the Drip Receiver 14, and is automatically closed by the pressure of water in the intermediate chamber when the Dry-Pipe Valve operates.

16—(Figs. A, B, C, D) Plunger to release the Ball Check and drain the body of the Dry-Pipe Valve before the Hand-Hole Plate 18 is opened, also to test for the proper position of the ball.

17—(Figs. A, B, C, D) Drip Pipe from Receiver 14 and should be run as direct as possible to an open receiver, such as a sink, water closet or open drain of any kind; its end must be left open to the atmosphere and be protected from freezing.

18—(Fig. B) Hand-Hole Plate which gives access to the interior of the Dry Pipe Valve.

19—(Figs. B, C, D) Electric Alarm Circuit Closer.

20—(Figs. B, C, D) Double Wires for connecting the Circuit Closer 19 with the Electric Gong and the Electric Battery.

21—(Figs. A, B, C, D) ¾-inch Galvanized Pipe which connects the intermediate chamber of Dry-Pipe Valve Body below the Diaphragm 5 with the Electric Circuit Closer 19. When the Dry-Pipe Valve operates, the full water pressure enters into the Pipe 21 to the Electric Circuit Closer 19, and the pressure upon a flexible metal diaphragm closes the electric circuit and sounds a continuous Electric Alarm.

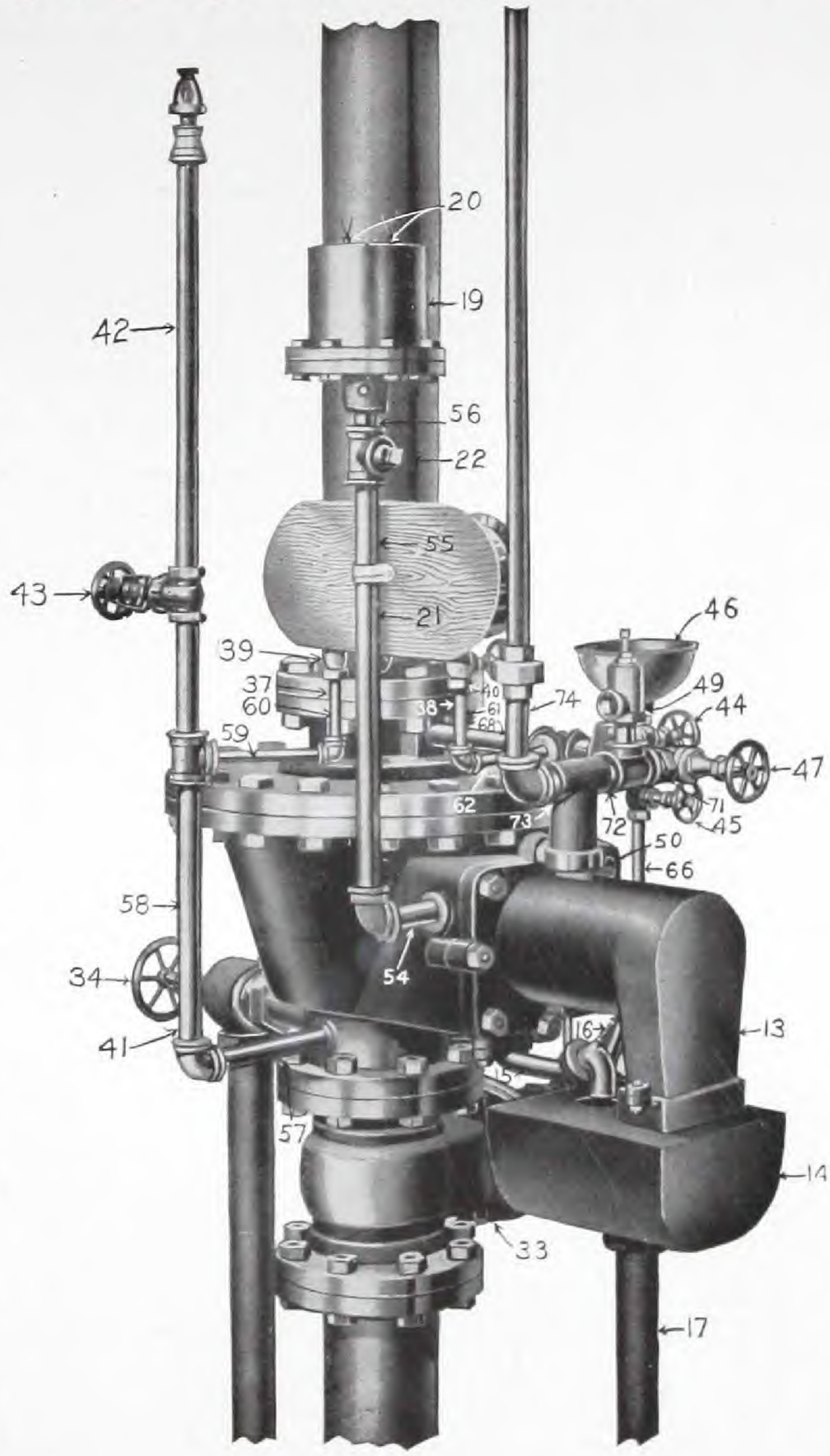


Fig. C.

Manufacture of Grinnell Straightway Dry-Pipe Valves, Types "A" and "B" has been discontinued. We can no longer furnish replacement Valves of these types, make repairs, or furnish repair parts except as noted on pages 84 to 86.

When ordering parts of the Grinnell Straightway Dry-Pipe Valve, Type "B" for replacement be sure to indicate Page Number, Article Number and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell Straightway Dry-Pipe Valve, Type "B"

Various Parts of Valve and Alarms (Continued)

22—(Figs. B, C, D) Tee with ¾-inch outlet in Pipe 21 to be installed only when Water Motor Alarm is used

23—(Fig. E) ¾-inch Galvanized Pipe connecting the intermediate chamber of Dry-Pipe Valve with the Water Motor 25 through Pipe 21 and Tee 22.

24—(Fig. E) Alarm Gong.

25—(Fig. E) Water Motor operating Alarm Gong.

26—(Fig. E) Gong Striker.

27, 28, 29, 30—(Fig. E) Connecting Parts to Water Motor Alarm Gong.

31—(Fig. E) Cast Iron Hood placed over Alarm Gong.

32—(Fig. E) 1½-inch Pipe for draining Water Motor 25.

33—(Figs. B, C, D) Main Gate Valve which controls water supply to system.

34—(Figs. A, B, C, D) 2-inch Draw-off Valve and Pipe for emptying the entire system of water which can also be used as a Test Valve to determine the volume of flow in the supply pipe.

35—(Fig. B) Pressure Gauge to indicate the pressure of Water in the supply pipe.

36—(Fig. B) Pressure Gauge to indicate the pressure of Air in the Sprinkler System.

37—(Figs. B, C, D) Pipe leading to Gauge 35.

38—(Figs. B, C, D) Pipe leading to Gauge 36.

39, 40—(Figs. B, C, D) ¼-inch Side Outlet Valves which may be closed and used for testing the pressure gauges by removing plugs and attaching Test Gauges.

41—(Figs. A, C, D) Connection for supply to Gauge 35, also 3-Way Cock 51, (Fig. D) or By-Pass Test Connection 53, 54, 55, (Fig. F), when installed.

42—(Figs. B, C, D) ¾-inch Connection for Automatic Sprinkler in Valve Room.

43—(Figs. C, D) ¾-inch O. S. & Y. Gate Valve to control Automatic Sprinkler in Valve Room when the Sprinkler is connected to the supply side of the Dry-Pipe Valve, as shown. All Insurance Inspection Departments now prefer that the sprinkler be supplied from the system side of the Dry-Pipe Valve.

44—(Figs. B, C, D) Cross Valve used for the purpose of ascertaining that the system of sprinklers and piping is free of water down to this level.

45—(Figs. B, C, D) ⅜-inch Valve to be kept closed except when Valve 44 is opened to test for water above the Air Seat 3.

46—(Figs. B, C, D) Funnel for priming Dry-Pipe Valve.

47—(Figs. B, C, D) ¾-inch Valve controlling air supply from air compressor.

48—(Fig. B) ¾-inch Check Valve to hold pressure in sprinkler system while air is being pumped in.

49—(Figs. B, C, D) ¾-inch Brass Relief Valve in connection from air compressor to avoid the possibility of creating too great an air pressure on top of Dry-Pipe Valve. This Relief Valve is normally set for 40 lbs. air pressure when water pressure does not exceed 100 lbs.

50—(Figs. B, C, D) ¾-inch Sediment Strainer to prevent scale or other foreign matter from injuring the seats of Valves 47, 48 and 49, and from being carried into the Dry-Pipe Valve.

NOTE:—See page 58 for Testing Devices.

Instructions for Maintenance

The chief problem in maintaining a Dry-Pipe System is the keeping of the proper air pressure in relation to the water pressure supplying the system.

The following table of air and water pressures is a safe guide to follow in practice:

WATER PRESSURE	AIR PRESSURE	
Maximum	Not less than	Not more than
50 lbs.	15 lbs.	25 lbs.
75 "	20 "	30 "
100 "	25 "	35 "
125 "	30 "	45 "
150 "	35 "	50 "

If air pressure is kept on the system according to the foregoing table there will be no difficulty experienced in preventing the Dry-Pipe Valve from tripping unnecessarily.

In case, however, water, either through accident or through the operation of sprinklers in a fire, should get into the dry part of the system, the system can be emptied as follows: Close the Main Gate Valve 33 in the Supply Pipe, after notifying the Insurance Interests that the Valve is to be closed, and stationing a man at the Valve until it is reopened. Then open the Draw-Off Valve 34, figure B, and do not close it until the water has ceased to run. Then open Drain and Vent Valves throughout the system, which will allow most of the water to run out. Close the Drain and Vent Valves and then open the Ball Check Valve 15 by pressing on the Plunger 16 to drain the body of the Dry-Pipe Valve.

When this has been done, open the Hand-Hole Plate 18, and if Gate 1, Figure A, is not out of the waterway, push it out with one hand, raising the Casting 6 up clear of Gate 1 with the other hand. Then carefully wipe clean both faces of Gate 1 and Seats 2 and 3. Then raise Casting 6 and push Gate 1 into position, letting down Casting 6 very

The Grinnell Straightway Dry-Pipe Valve, Type "B"

Instructions for Maintenance (Continued)

easily. Pump a few pounds of air pressure which will force the water from the low points in the system, as you separately open the Drain Valves.

When the system has been thoroughly drawn off according to the foregoing directions, shut all Drain Valves.

Next fill the body of the Dry-Pipe Valve above the Seat 3 with water through the Valve 44, Figures B and C, by means of Funnel 46, Valve 45 being closed. When water ceases to run from the funnel, open Valve 45 and draw out what water will run out. Then close both the Valves 44 and 45. Next pump up sufficient air pressure in the sprinkler system to hold the Dry-Pipe Valve closed against the water pressure in the Supply Pipe and tightly close Valve 47 and the Draw-off Valve 34. Now open wide Main Gate Valve 33 and see that Seats 2 and 3 are tight. If no leak is found, bolt on the Hand Hole-Plate 18 so that the joint will be water tight. If either Seat 2 or 3 leaks, it will be on account of dirt on the seat. In this case, shut Main Gate Valve 33 and open Draw-off 34, let the air pressure off through the Valve 44, and proceed to clean the surfaces of Gate 1 and the Seats 2 and 3.

IN SETTING THE VALVE, BE SURE NEVER TO APPLY GREASE, TALLOW, OR ANY OILY SUBSTANCE TO VALVE SEATS 2 AND 3.

If these directions are carefully followed, the Dry-Pipe Valve will be closed without any sediment being left on the Valve Seat, it being one of the special objects of the construction of this valve to have perfectly clean Valves and Seats before subjecting them to pressure.

As it often happens that water may still settle to the low points of the system from condensation, it is well to repeat the pumping up of a little air pressure at intervals, and also to continue the separate opening of Drain Valves occasionally, to expel any such accumulation.

Be Sure that your Air Compressor is Always in Good Working Order.

Operation of Dry-Pipe Sprinkler System

When the air pressure in the system is relieved by the opening of a sprinkler, the Gate 1 is no longer held against the Water Seat 2. The pressure of water then lifts Gate 1 and Casting 6 and, entering the intermediate chamber through Water Seat 2, acts on the Piston 9 and Casting 6. As Gate 1 is allowed to rise but half the distance which Casting 6 rises, Gate 1 and Casting 6 are forcibly separated at Air Seat 3, and Gate 1 is drawn from the waterway by Piston 9 without chance of sticking to or dragging across either Seat 2 or 3, and a straight unobstructed passage is left for the water.

Piston 9, at the end of its movement, closes the Vent 11, as shown by dotted lines.

The pressure of water in Pipe 21 causes an alarm to be sounded.

Inspection

1st. Open Valves 44 and 45 to see that the system of sprinklers and piping is free of water down to this level. If any water appears, draw it off, and then tightly close Valves 44 and 45.

2nd. Open the Hand-Hole Plate 18 occasionally (say twice a year) and see that the Water Seat 2 and the Air Seat 3 are tight; also that the intermediate chamber is clear and free from deposits or other obstructions. This is accomplished by simply looking in at the Hand-Hole. THEN SHUT AND BOLT ON HAND-HOLE PLATE 18.

3rd. Depress Plunger to see that the ball is not closing the throat of Ball Check Valve 15.

After making the above examination there is nothing more for an inspector to do, and it follows that, as far as the Grinnell Straightway Dry-Pipe Valve is concerned, the system is in perfect working order.

Water Motor and Electric Alarms

The Water Motor Alarm shown in Fig. E is made operative by a water flow and to be sure that you will get a prompt alarm in case of fire this water motor should be periodically examined, to see that it is in perfect working order. You should primarily examine this alarm to see that the Water Motor Shaft 28 and Striker 26, Fig. E, are perfectly free to revolve without undue pressure being exerted.

NOTE:—If Hood 31 of the old style made of galvanized iron and installed previous to 1916 becomes rusted or damaged, and your water motor is otherwise in good running condition, we suggest that you replace the old Hood with our Cast Iron Hood 31 as shown in Figure E, this being furnished complete with base.

If you have an Electric Alarm connected with your sprinkler system it should be periodically tested to ascertain if it is in working order, and the batteries properly charged.

When 3-Way Cock 51, Fig. D is installed, the Alarms may be tested by turning the handle of 3-Way Cock one-quarter turn. After test has been made the handle should be turned back to normal position and sealed.

When a By-Pass Test Connection is installed as shown in Figure F, the Alarms may be tested by opening Valve 53. After test has been made, Valve 53 should be closed.

(See page 58)

The Grinnell Straightway Dry-Pipe Valve, Type "B"

Alarm Testing Devices

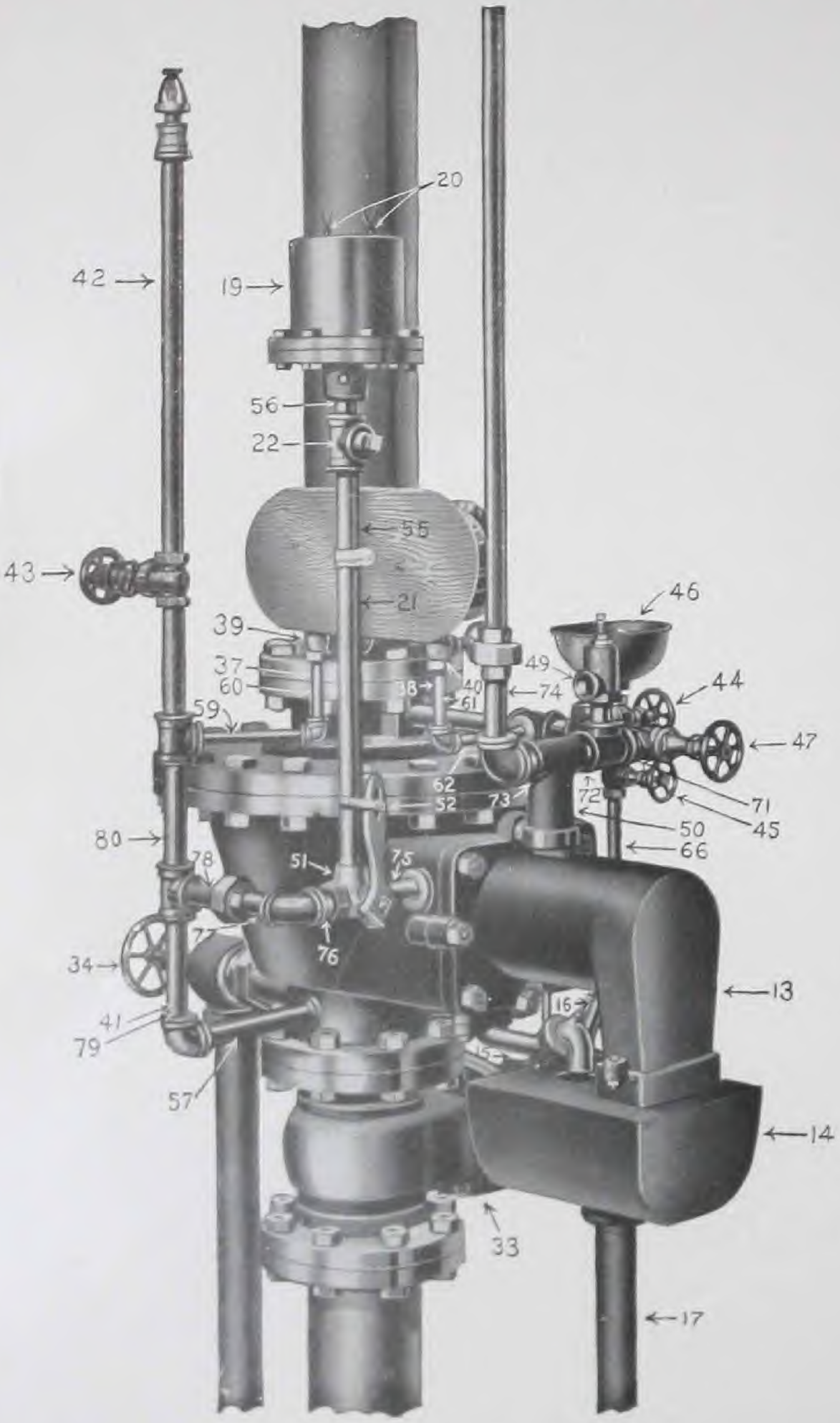


Fig. D.

3-Way Test Cock

51—(Fig. D) 3-Way Test Cock to test either the Electric Alarm, the Water Motor Alarm, or both, without operating the Dry-Pipe Valve. Moving the handle one-quarter turn will test the Alarm or Alarms, while a half-turn from normal position will shut off all alarms.

52—(Fig. D) Valve Seal to seal handle of 3-Way Cock in normal position.

NOTE:—Manufacture of this Cock has been discontinued. If the 3-Way Cock gets out of order, it should be replaced with a By-Pass Test Connection as shown in Figure F.

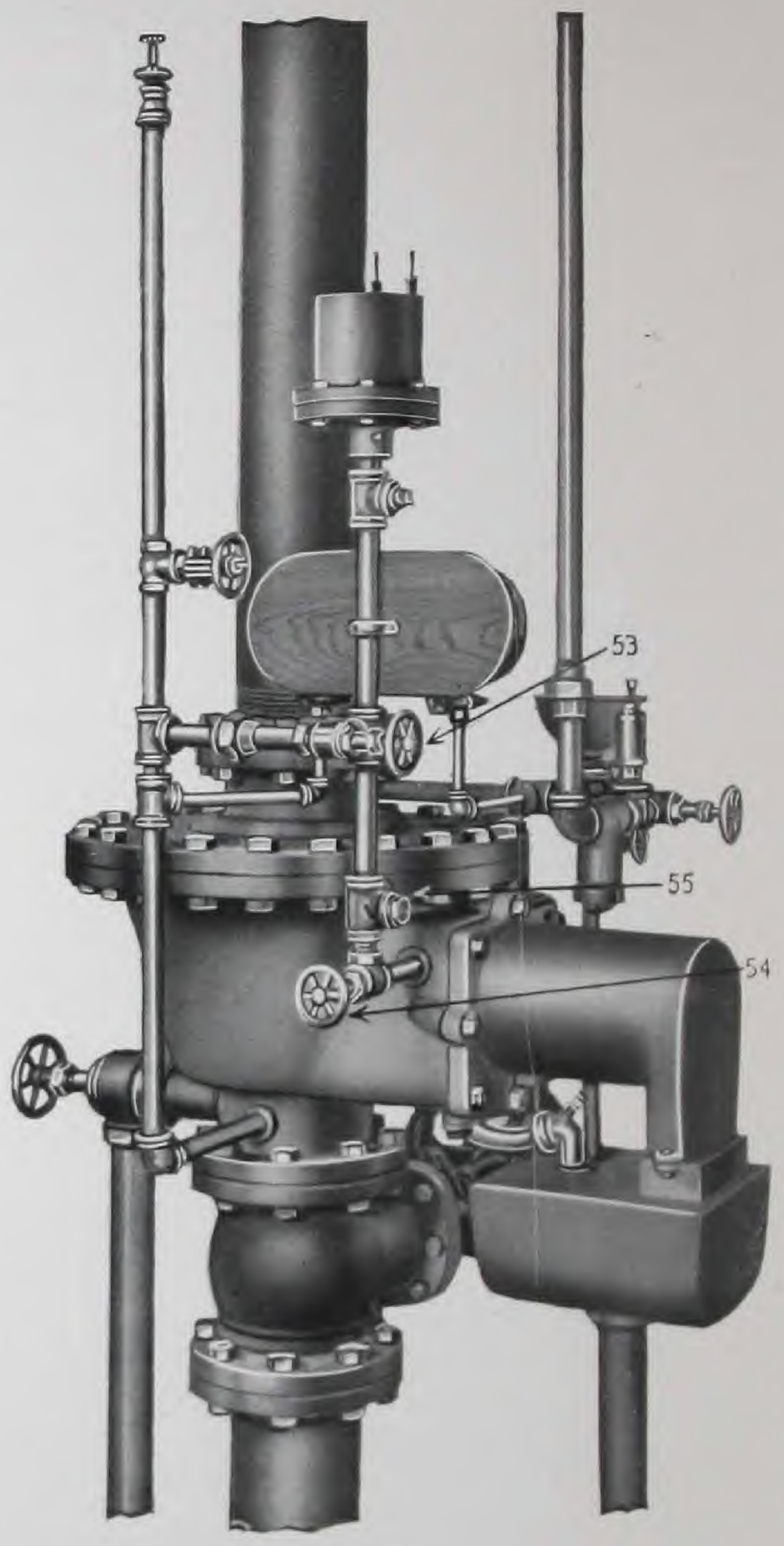


Fig. F.

By-Pass Test Connection

53—(Fig. F) Valve to test either the Electric Alarm or the Water Motor Alarm or both, without operating the Dry-Pipe Valve.

54—(Fig. F) Valve to shut off Alarm after Dry-Pipe Valve has operated and necessary alarm has been given.

This Valve should be SEALED OPEN.

55—(Fig. F) Check Valve so placed as to prevent the flooding of intermediate chamber when alarms are tested with Valve 53. This check has a $\frac{3}{32}$-inch hole in clapper to drain automatically the alarm piping after testing Alarms.

The Grinnell Dry-Pipe Valve, Model "C"

Instructions for Maintenance

The chief problem in maintaining a Dry-Pipe System is the keeping of the proper air pressure in relation to the water pressure supplying the system. The construction of this Dry-Pipe Valve is such that one pound of air pressure will hold back approximately six pounds of water pressure. In practice, the relation between water and air pressures should be maintained according to the following table:

WATER PRESSURE	AIR PRESSURE	
MAXIMUM	NOT LESS THAN	NOT MORE THAN
50 lbs.	15 lbs.	25 lbs.
75 "	20 "	30 "
100 "	25 "	35 "
125 "	30 "	45 "
150 "	35 "	50 "

If air pressure is kept on the system according to the foregoing table, there will be no difficulty experienced in preventing the Dry-Pipe Valve from tripping unnecessarily.

In case, however, water, either through accident or through the operation of sprinklers in a fire, should get into the dry part of the equipment, the system should be emptied, and Dry-Pipe Valve reset as follows:

1—Close Main Gate Valve 33 in Supply Pipe under Dry-Pipe Valve, after notifying the Insurance Interests that it is to be closed, and stationing a man at the Valve until it is reopened.

2—Open Draw-off Valve 34, closing it when water has ceased to run.

3—Open Drain Valves and Vents throughout the system, closing them when water has ceased to run.

4—Open Valve 41 to drain the body of the Dry-Pipe Valve.

5—Remove Hand-Hole Cover 2 by loosening bolts around the outside, and with a piece of clean waste carefully clean the Air Seat 5, Rubber Diaphragm 6, Water Seat 3 and Clapper 4, *otherwise they may be ruined.*

6—Push the Centre Valve Casting 7 slowly from you until it drops into place; then raise the Latch Weight 10, by means of the projection which extends into the Drip Funnel 16, until the Centre Valve becomes thoroughly seated.

7—Replace the Hand-Hole Cover 2 and gasket and tighten all bolts.

8—Close Valve 42 and open Valve 48. Then fill the body of Dry-Pipe Valve through the Funnel 40 by opening Priming Valve 39 until water remains in the Funnel, showing that the water is up to the proper level. Close Valve 41, and open Valve 42 to drain surplus water from Funnel. Leave Valve 42 open.

9—Close Valve 48 and open Valve 44 and pump a few pounds of air pressure on the system.

10—Open Drain Valves separately to force water from low points of the system. Close all Drain Valves.

11—Pump sufficient air into the Sprinkler System to hold the Dry-Pipe Valve closed against the water pressure in the supply pipe. Close Valve 44.

12—Open Main Gate Valve 33 slowly, and observe if water leaks past Drip Valve 11 into the Drip Funnel 16. If there is no leakage, Dry-Pipe Valve Seats 3 and 5 are tight. The Main Gate Valve 33 should then be opened wide.

CAUTION: IN SETTING THE DRY-PIPE VALVE, BE SURE NEVER TO APPLY GREASE, TALLOW, OR ANY OILY SUBSTANCE TO VALVE SEATS 3 OR 5. WATER MUST NOT BE ALLOWED TO STAND ABOVE THE ¾" AIR INLET WHERE IT MIGHT FREEZE OR EXERT PRESSURE ON THE DIAPHRAGM 6.

As water from condensation may settle at the low points of the system, it will be prudent to partially open all Drain Valves occasionally throughout the system, and if water appears, draw it off, closing the Valves as soon as air appears. Partially open Valve 48 and see if water appears. If water does appear, it should be drawn off by partially opening Valve 41, figure C. When water ceases to flow through Valve 48, close both of these Valves.

Be Sure that your Air Compressor is Always in Good Working Order.

Operation of the Dry-Pipe Sprinkler System

When the air pressure in the system is relieved by the opening of a Sprinkler, the water pressure under Seat 3 causes the Clapper 4 to be raised, allowing the Latch Weight 10 to fall and close the Drip Valve 11. The intermediate chamber fills with water, the pressure of which rotates the Centre Valve 7 about the Hinge Pin 9 to its open position against the Hand-Hole Cover, giving a full size unobstructed passage for the water. The pressure of water filling Pipe 21 causes an alarm to be sounded.

Inspection

1—Open Valve 48 slightly to see if the system of sprinklers and piping is free of water down to the level of Air Inlet. If water appears, draw it off slowly by partially opening Valve 41. When water ceases to flow through Valve 48, close both of these Valves.

2—Observe whether there is any leakage of water through Drip Valve 11 into the Drip Funnel 16. See that Latch Weight 10 is free to move by exerting pressure on extension of Drip Valve 11. If no water appears, Air Seat 5 and Water Seat 3 are tight.

3—Test automatic alarm as per instructions under heading "Testing of Alarms" on pages 62 and 63.

The Grinnell Dry-Pipe Valve, Model "C"

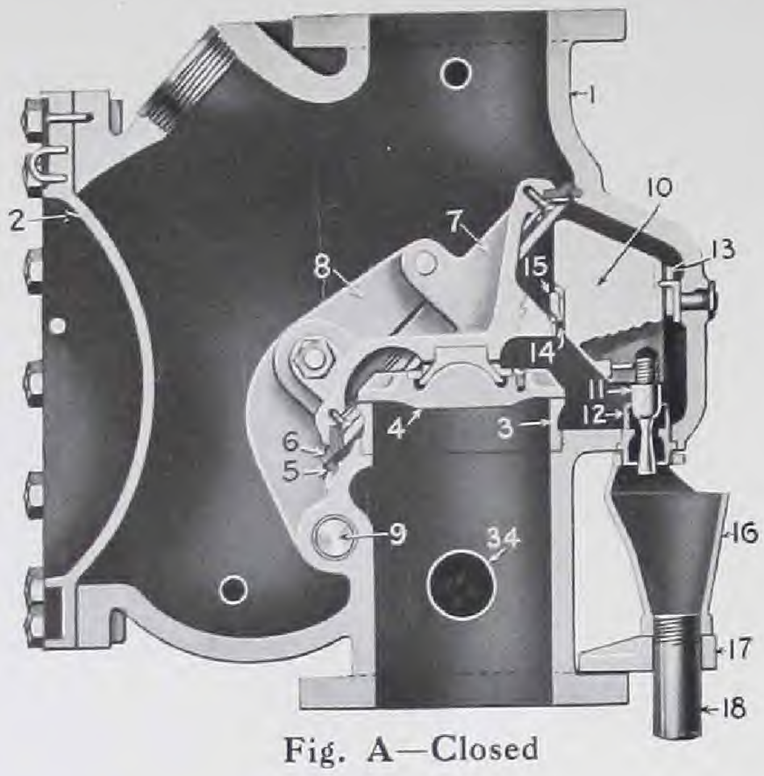


Fig. A—Closed

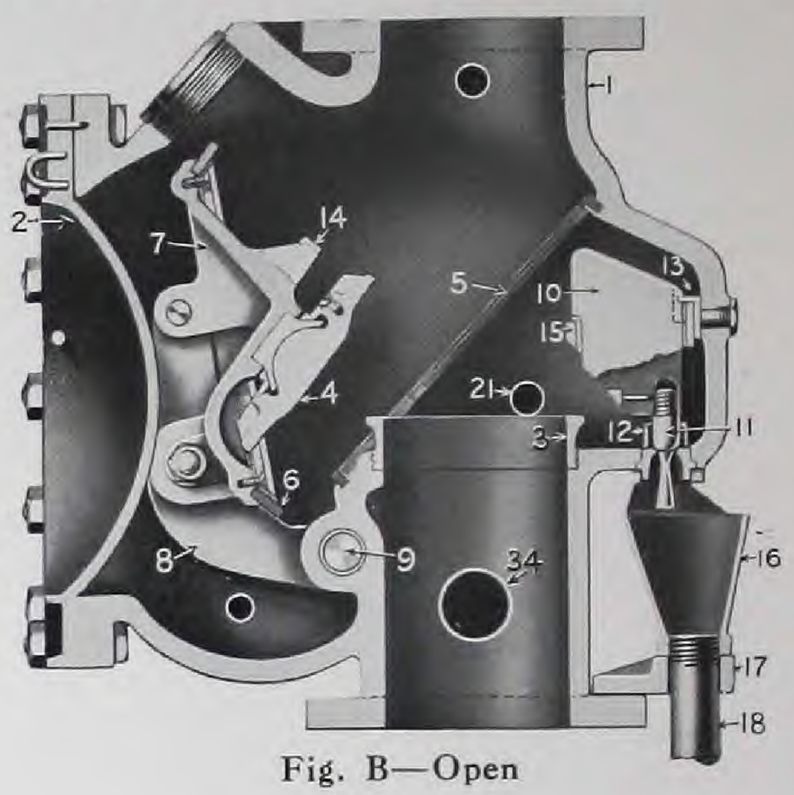


Fig. B—Open

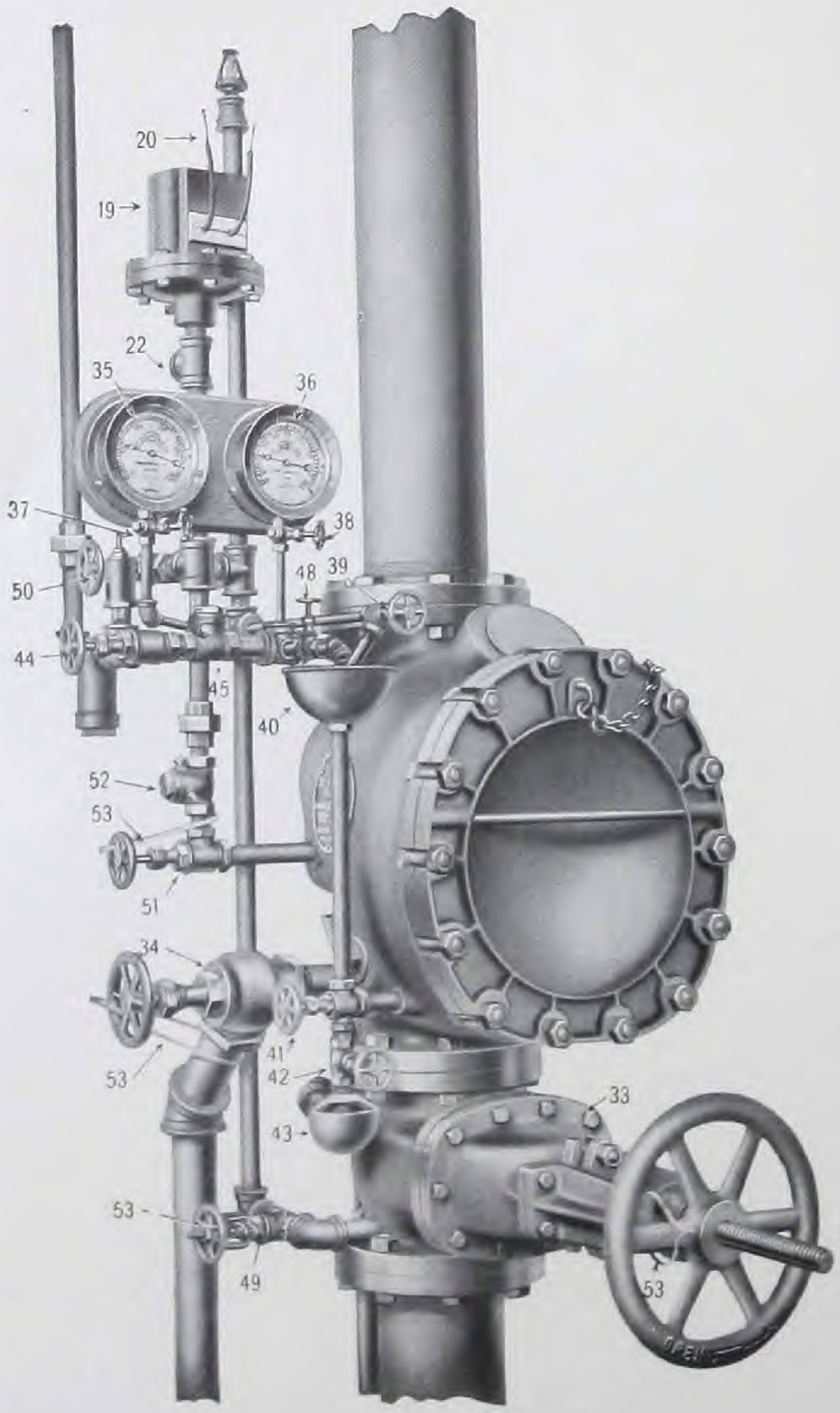


Fig. C

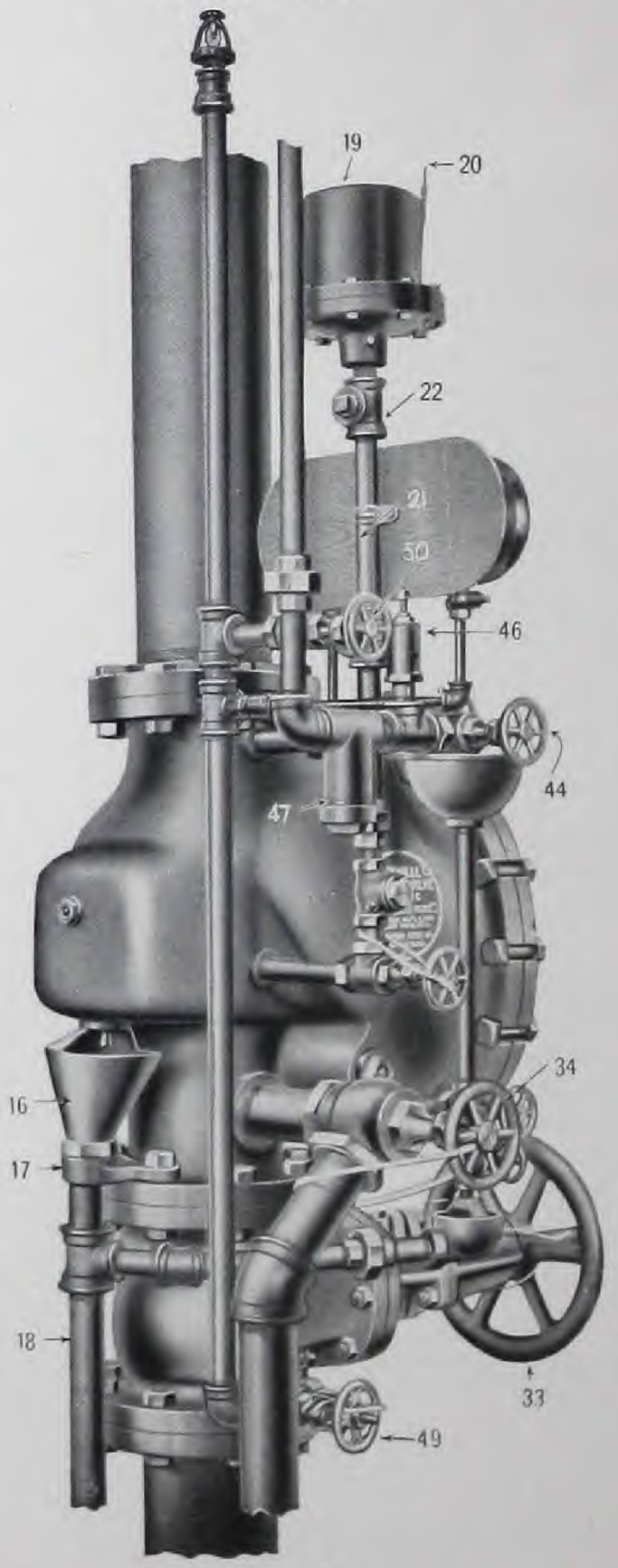


Fig. D

Manufacture of Grinnell Dry-Pipe Valve, Model "C" has been discontinued. We can no longer furnish replacement Valves of this model, or furnish repair parts except as noted on pages 84 to 86.

When ordering parts of the Grinnell Dry-Pipe Valve, Model "C" for replacement be sure to indicate Page Number, Article Number and Booklet Edition Number. (This is the Fourth Edition)

The Grinnell Dry-Pipe Valve, Model "C"

Various Parts of Valve and Alarms

The following parts are standard in all Insurance Jurisdictions

(See pages 62 and 63 for special trimmings for the different Insurance Jurisdictions)

1—(Figs A, B) Dry-Pipe Valve Body

2—(Figs. A, B) Hand-Hole Cover which gives access to the interior of the Dry-Pipe Valve for cleaning and setting.

3—(Figs. A, B) Bronze Water Seat.

4—(Figs. A, B) Ball Jointed Bronze Clapper which closes the Water Seat.

5—(Figs. A, B) Babbitt Air Seat.

6—(Figs. A, B) Rubber Diaphragm which closes Air Seat 5.

7—(Figs. A, B) Centre Valve Casting which carries the Rubber Diaphragm 6 and Bronze Clapper 4.

8—(Figs. A, B) Centre Valve Arms to which the Centre Valve Casting 7 is bolted.

9—(Figs. A, B) Bronze Hinge Pin about which the parts 4-6-7 and 8 rotate as one piece, forming the essential moving member of the Dry-Pipe Valve.

10—(Figs. A, B) Latch Weight which falls at a slight opening of the Clapper 4 and prevents reseating of Valve by engaging Facings 14 and 15.

11—(Figs. A, B) Drip Valve fastened to Latch Weight 10.

12—(Figs. A, B) Drip Valve Seat which drains the intermediate chamber or space between Air and Water Seats, allowing any slight leakage of water past Water Seat 3 to flow into Drip Funnel 16, but is automatically closed by Drip Valve 11 when Dry-Pipe Valve operates.

13—(Figs. A, B) Latch Weight Guide to limit side movement of Latch Weight 10.

14—(Figs. A, B) Center Valve Facing for Latch.

15—(Figs. A, B) Latch Weight Facing which engages Centre Valve Facing 14 when Latch Weight 10 falls and prevents reseating of the Centre Valve.

16—(Figs. A, B, D) Drip Funnel.

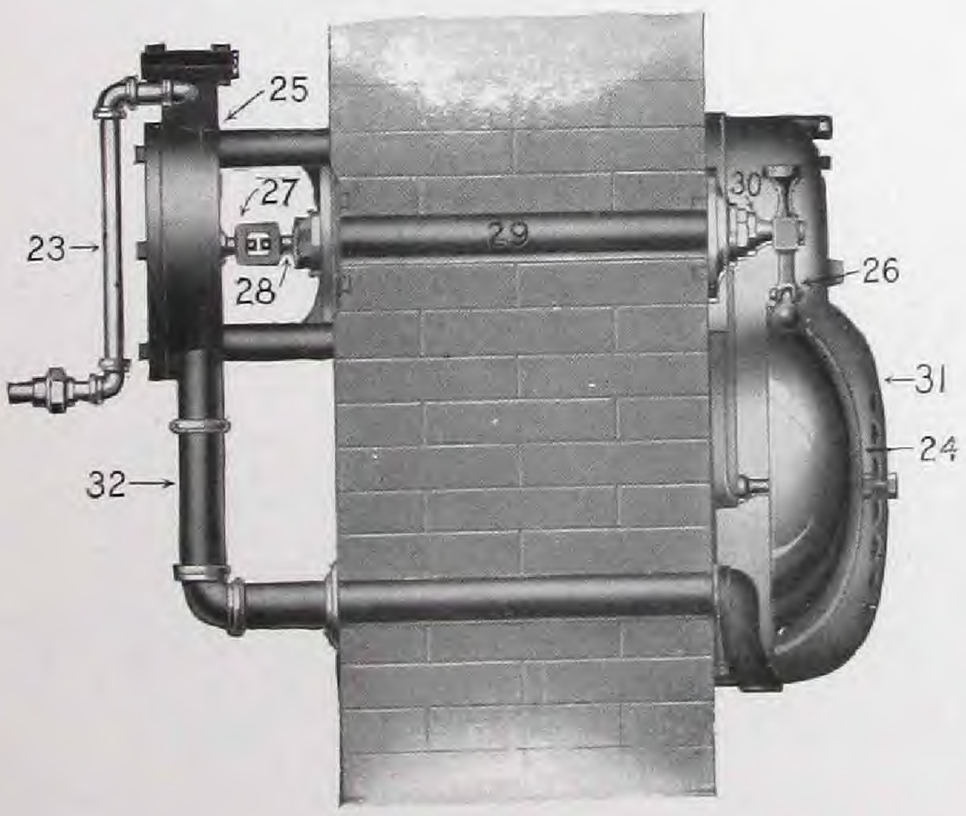


Fig. E

17—(Figs. A, B, D) Drip Funnel Support.

18—(Figs. A, B, D) Drip Pipe from Drip Funnel 16 and Drain Cup 43.

19—(Figs. C, D) Electric Alarm Circuit Closer.

20—(Figs. C, D) Wires for connecting the Circuit Closer 19 with the Electric Gong and the Electric Battery.

21—(Fig. D) ¾-inch Galvanized Pipe which connects the intermediate chamber of the Dry-Pipe Valve Body with the Electric Circuit Closer 19. When the Dry-Pipe Valve operates, the full water pressure enters into the Pipe 21 to the Electric Circuit Closer 19, and the pressure upon a flexible metal diaphragm closes the electric circuit and sounds a continuous Electric Alarm.

22—(Figs. C, D) Tee with ¾-inch outlet in Pipe 21 to be installed only when Water Motor Alarm is used.

23—(Fig. E) ¾-inch Galvanized Pipe connecting the intermediate chamber of Dry-Pipe Valve with the Water Motor 25 through the Pipe 21 and Tee 22.

24—(Fig. E) Alarm Gong.

25—(Fig. E) Water Motor operating Alarm Gong.

26—(Fig. E) Gong Striker.

27, 28, 29, 30—(Fig. E) Connecting Parts to Water Motor Alarm Gong.

31—(Fig. E) Hood placed over Alarm Gong.

32—(Fig. E) 1½-inch pipe for draining Water Motor 25.

33—(Figs. C, D) Main Gate Valve controlling water supply to system.

34—(Figs. C, D) Draw-off Valve and Pipe for emptying the entire system of water after Dry-Pipe Valve has tripped; can also be used as a Test Valve to determine the volume of flow in the supply pipe.

35—(Fig. C) Pressure Gauge to indicate the pressure of Water in the supply pipe.

36—(Fig. C) Pressure Gauge to indicate the pressure of Air in the sprinkler system.

37 and 38—(Fig. C) Side Outlet Globe Valves which may be closed and used for testing the Pressure Gauges by removing the plugs and attaching Test Gauges.

39—(Fig. C) ¼-inch Priming Valve supplying water for priming Dry-Pipe Valve.

40—(Fig. C) Funnel for priming Dry-Pipe Valve.

41—(Fig. C) Cross Valve used for priming Dry-Pipe Valve, also for draining body of Dry-Pipe Valve.

42—(Fig. C) Valve to be kept closed while priming Dry-Pipe Valve but kept open at other times.

43—(Fig. C) Drain Cup.

44—(Figs. C, D) Valve controlling air supply from Air Compressor.

45—(Fig. C) Check Valve to hold air in system while air is being pumped in.

46—(Fig. D) ¾-inch Brass Relief Valve in connection from Air Compressor to avoid the possibility of creating too great an air pressure on top of Dry-Pipe Valve. This Relief Valve is normally set at 40 pounds air pressure when water pressure does not exceed 100 pounds.

47—(Fig. D) ¾-inch Sediment Strainer to prevent scale or other foreign matter from being carried into Dry-Pipe Valve and injuring the seats of valves 44, 45 and 46.

48—(Fig. C) ¼-inch Test and Vent Valve to see that system is free from water down to the level of the air inlet. This valve must be open while priming Dry-Pipe Valve but kept closed at other times.

The Grinnell Dry-Pipe Valve, Model "C"

Various Parts of Valve and Alarms (Continued)

Jurisdiction of Eastern Stock Insurance Companies

The following parts, shown in Figures C and D on page 60, are special trimmings and alarm testing devices to meet the requirements of the Eastern Stock Insurance Companies:

49—(Figs. C, D) ¾-inch O. S. and Y. Gate Valve supplied from beneath seat of Valve 33 and controls water to Pressure Gauge 35, Priming Valve 39, sprinkler in valve room when sprinkler is necessary; also water for testing alarms.

50—(Figs. C, D) Valve to test either the Electric Alarm or the Water Motor Alarm, or both, without operating the Dry-Pipe Valve.

51—(Fig. C) Valve to shut off Alarms after Dry-Pipe Valve has operated and necessary alarm has been given. This Valve should be SEALED OPEN.

52—(Fig. C) Check Valve so placed as to prevent the flooding of intermediate chamber when Alarms are tested with Valve 50. This check has a $\frac{3}{32}$-inch hole in clapper to automatically drain the alarm piping after testing Alarms.

53—(Fig. C) Valve Seals for sealing Valves 33, 49 and 51 open; and Valve 34 shut.

Testing of Alarms:

In order to test the Alarms with the Dry-Pipe Valve trimmed as shown in Figures C and D, open Valve 50. This allows water pressure from the supply pipe, controlled by Valve 49, to enter alarm piping and operate the Alarms if in working order. After this test has been made be sure that Valve 50 is again closed.

Jurisdiction of Associated Factory Mutual Fire Insurance Companies

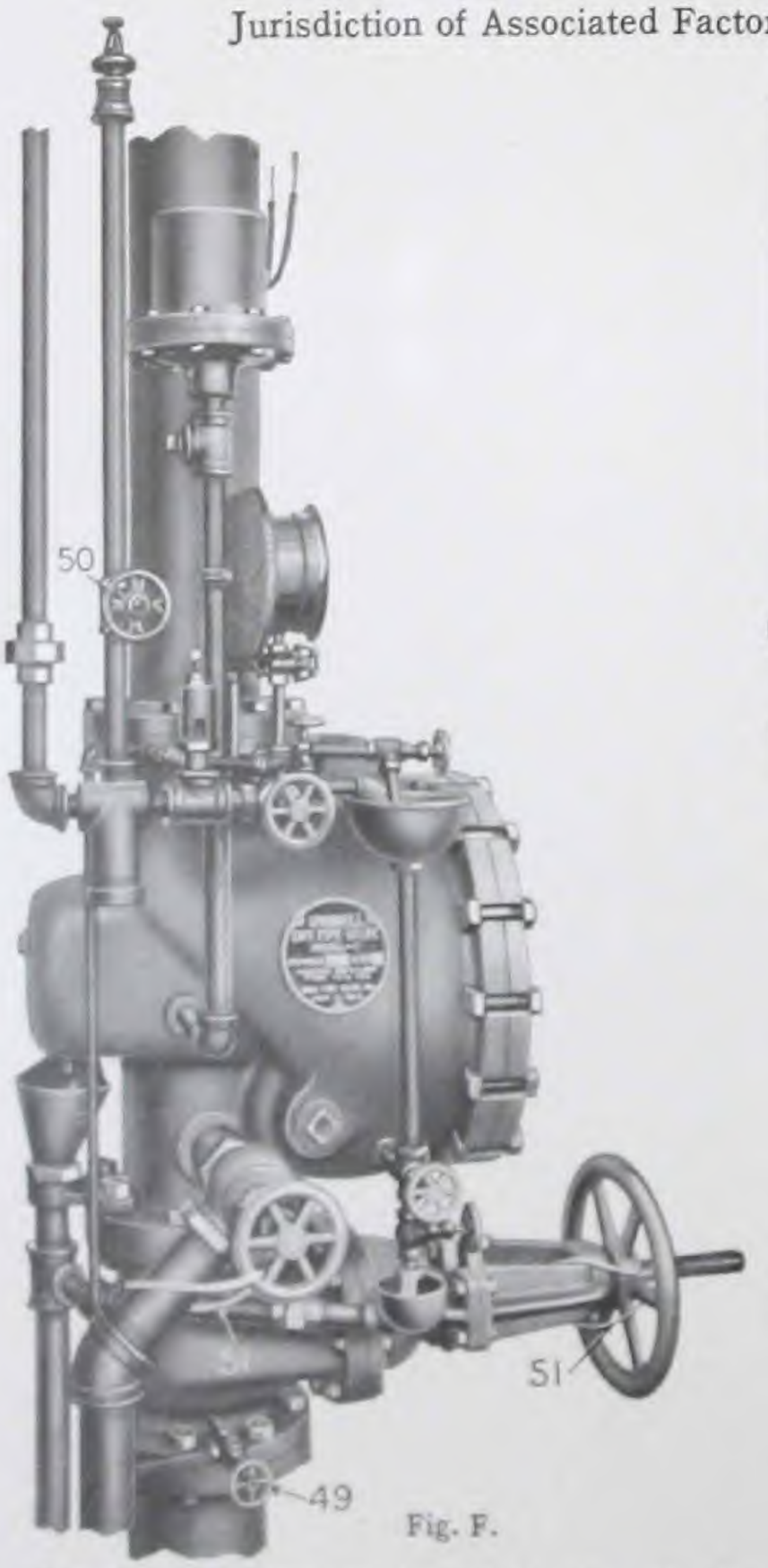


Fig. F.

Fig. G.

The above illustrations, F and G, show the Grinnell Dry-Pipe Valve, Model "C," especially trimmed to meet the requirements of the Factory Mutual Fire Insurance Companies:

49—(Figs. F, G) ¾" Valve supplied from beneath seat of Valve 33 and controls water to Pressure Gauge 35 and Priming Valve 39. (See Figs. C and D.)

50—(Fig. F) ¾" O. S. and Y. Gate Valve controlling supply to sprinkler in valve room when sprinkler is necessary.

51—(Figs. F, G) Valve Seals for sealing Valves 33 and 50 open and Valve 34 shut. (See Figs. C and D.)

Where Dry-Pipe Valves are connected with an Electric Alarm, a Single Pole Knife Switch should be installed in a test loop to test the Electric Alarm. Switch should be installed with handle hanging down when open.

(See Notes at bottom of Page 60).

The Grinnell Dry-Pipe Valve, Model "C"

Various Parts of Valve and Alarms (Continued)

Jurisdiction of the Central Actuarial Bureau

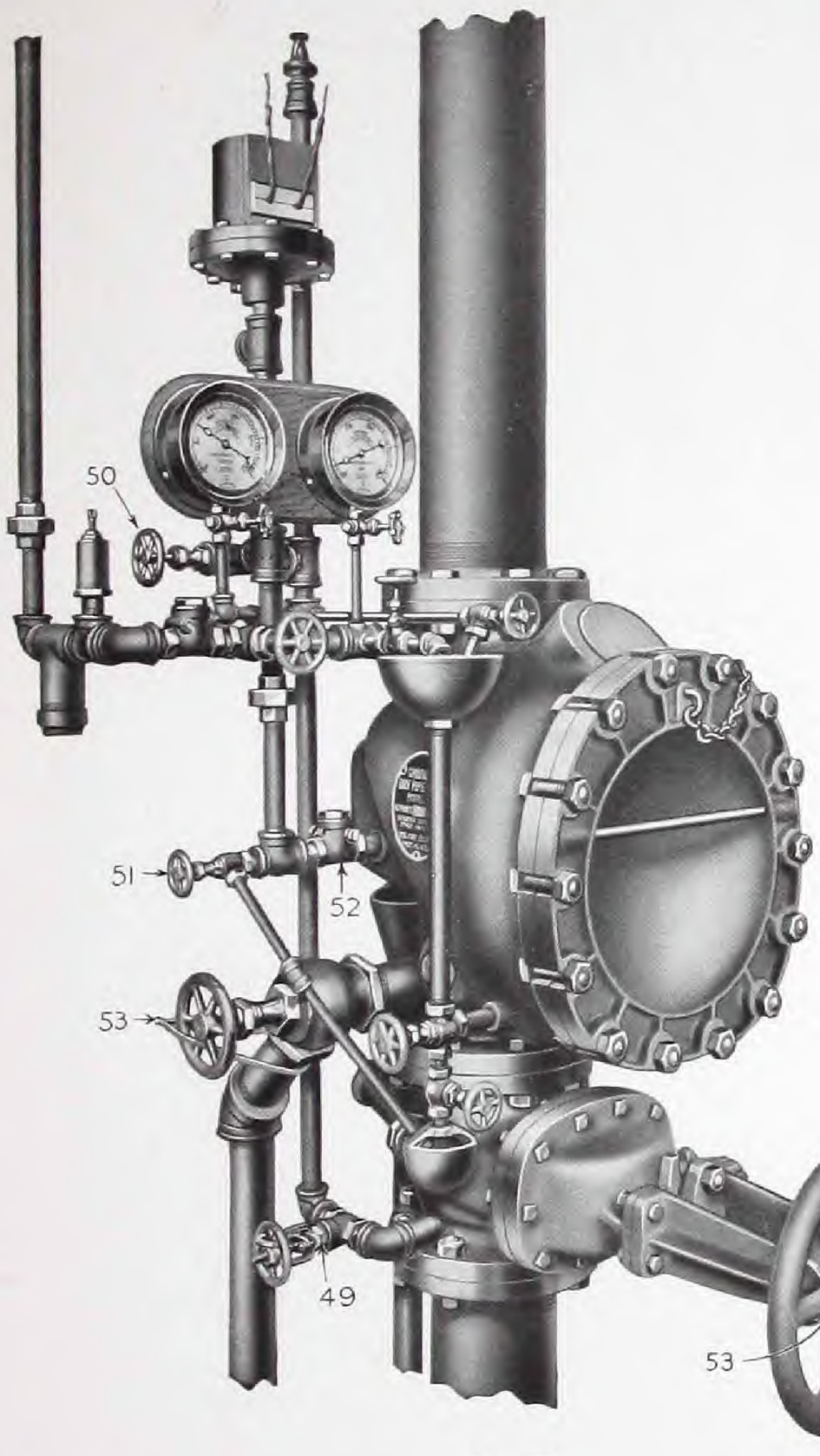


Fig. H

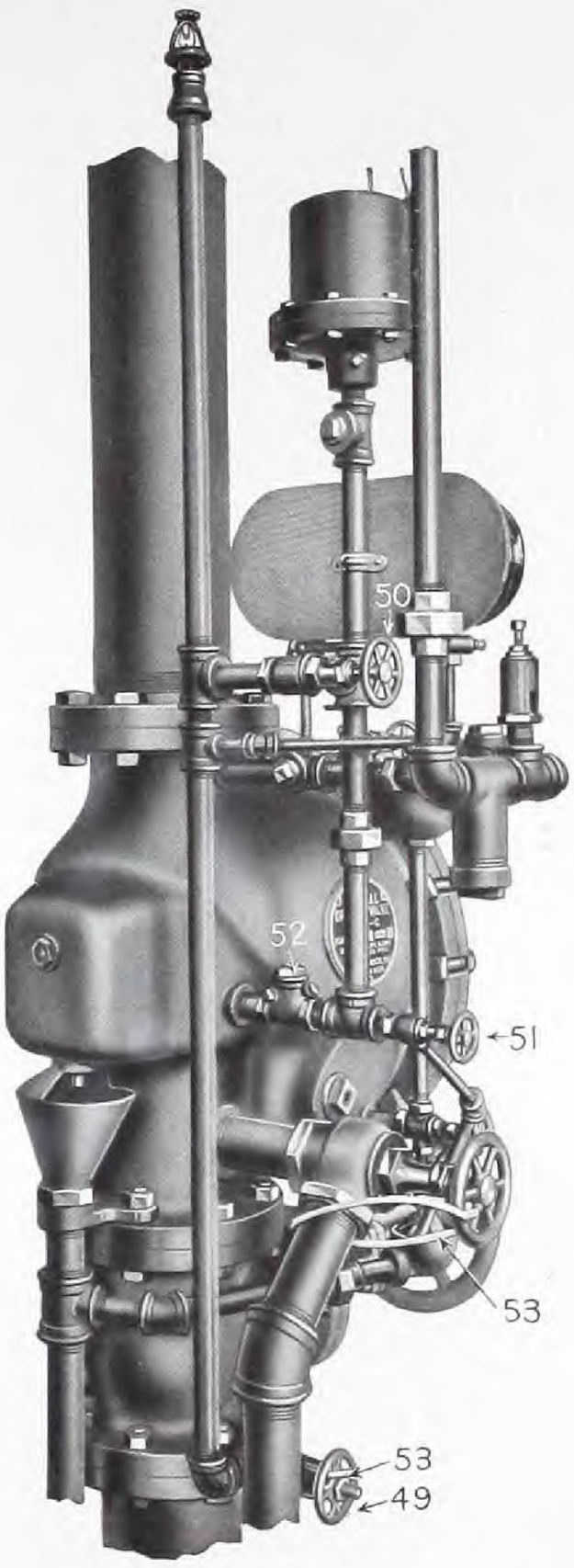


Fig. J

The above illustrations, H and J, show the Grinnell Dry-Pipe Valve, Model "C," with special trimmings to meet the requirements of the Central Actuarial Bureau:

49—(Figs. H, J) ¾" O. S. and Y. Gate Valve supplied from beneath seat of Valve 33 and controls water to Pressure Gauge 35, Priming Valve 39, water for testing alarms, and sprinkler in valve room when sprinkler is necessary and system is not supervised. (See Figs. C and D.)

50—(Figs. H, J) Valve to test either the Electric Alarm or the Water Motor Alarm, or both, without operating the Dry-Pipe Valve. This Valve should normally be kept closed.

51—(Figs. H, J) Angle Valve to drain alarm piping after operating Alarms. This Valve should be kept closed.

52—(Figs. H, J) Check Valve so placed as to prevent the flooding of intermediate chamber when Alarms are tested with Valve 50.

53—(Figs. H, J) Valve Seals for sealing Valves 33 and 49 open and Valve 34 closed. (See Figs. C and D.)

Note: When Supervisory Service is installed the sprinkler head in valve house may be connected to the ¾" plugged outlet of cross which supplies the air gauge instead of the water pipe as shown in cut. A ¾" O. S. and Y. Gate Valve should then be placed in the pipe leading to the sprinkler head.

Testing of Alarms:

In order to test the Alarms with the Dry-Pipe Valve trimmed as above shown in Figures H and J, open Valve 50. This allows water pressure from the supply pipe, controlled by Valve 49, to enter alarm piping, and operate the Alarms if in working order. After this test has been made be sure that Valve 50 is again closed.

(See Notes at bottom of Page 60)

The Grinnell Dry-Pipe Valve, Model "D"

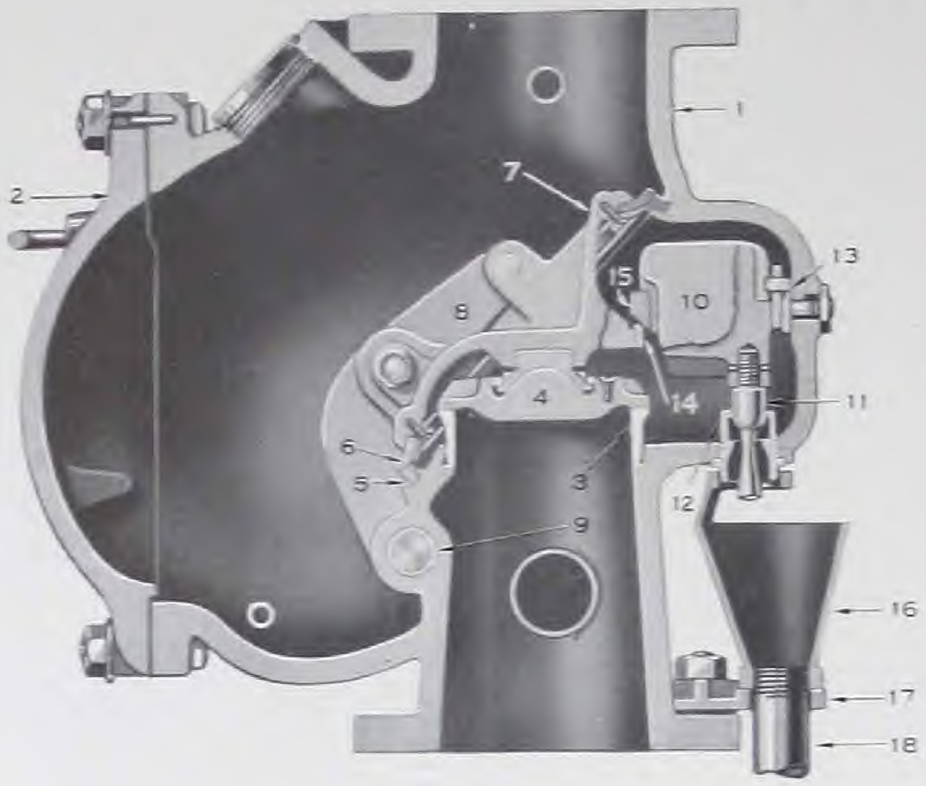


Fig. A—Closed

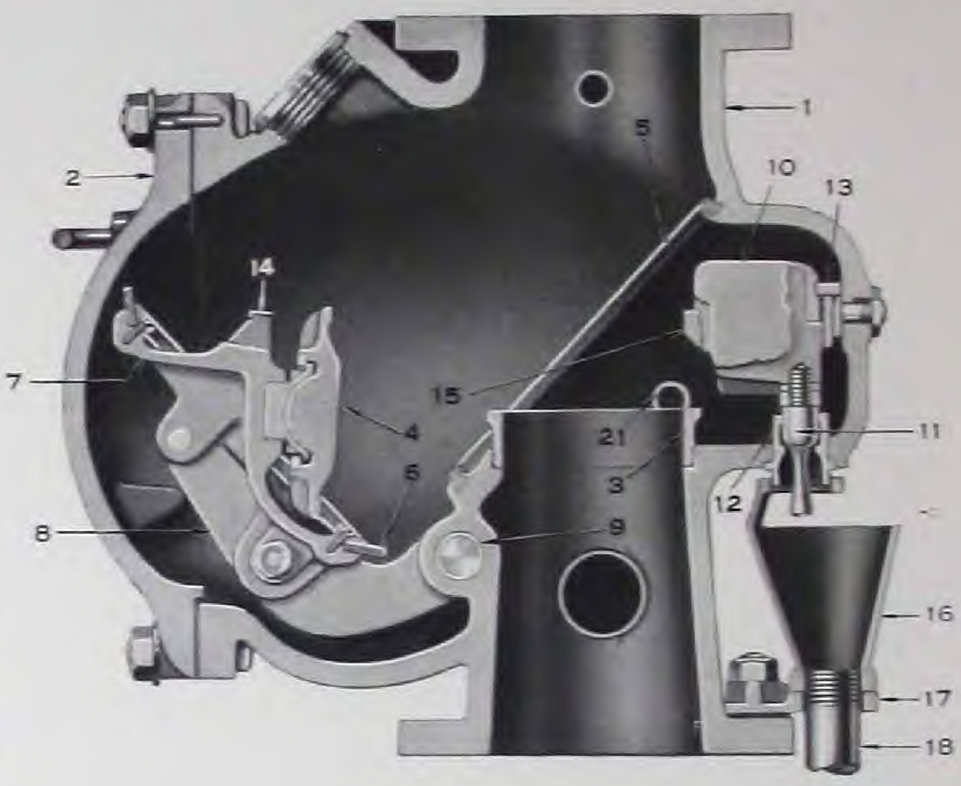


Fig. B—Open

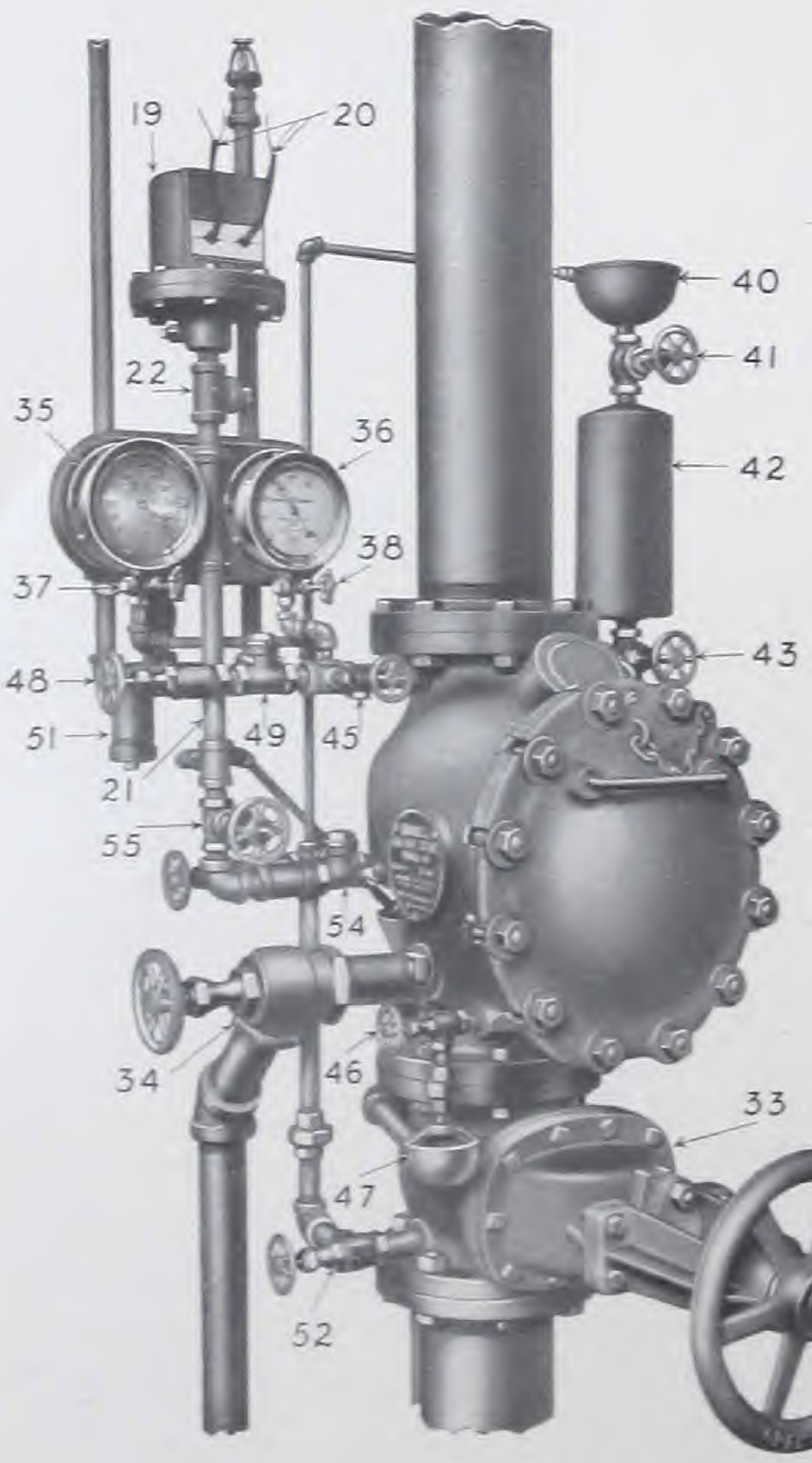


Fig. C

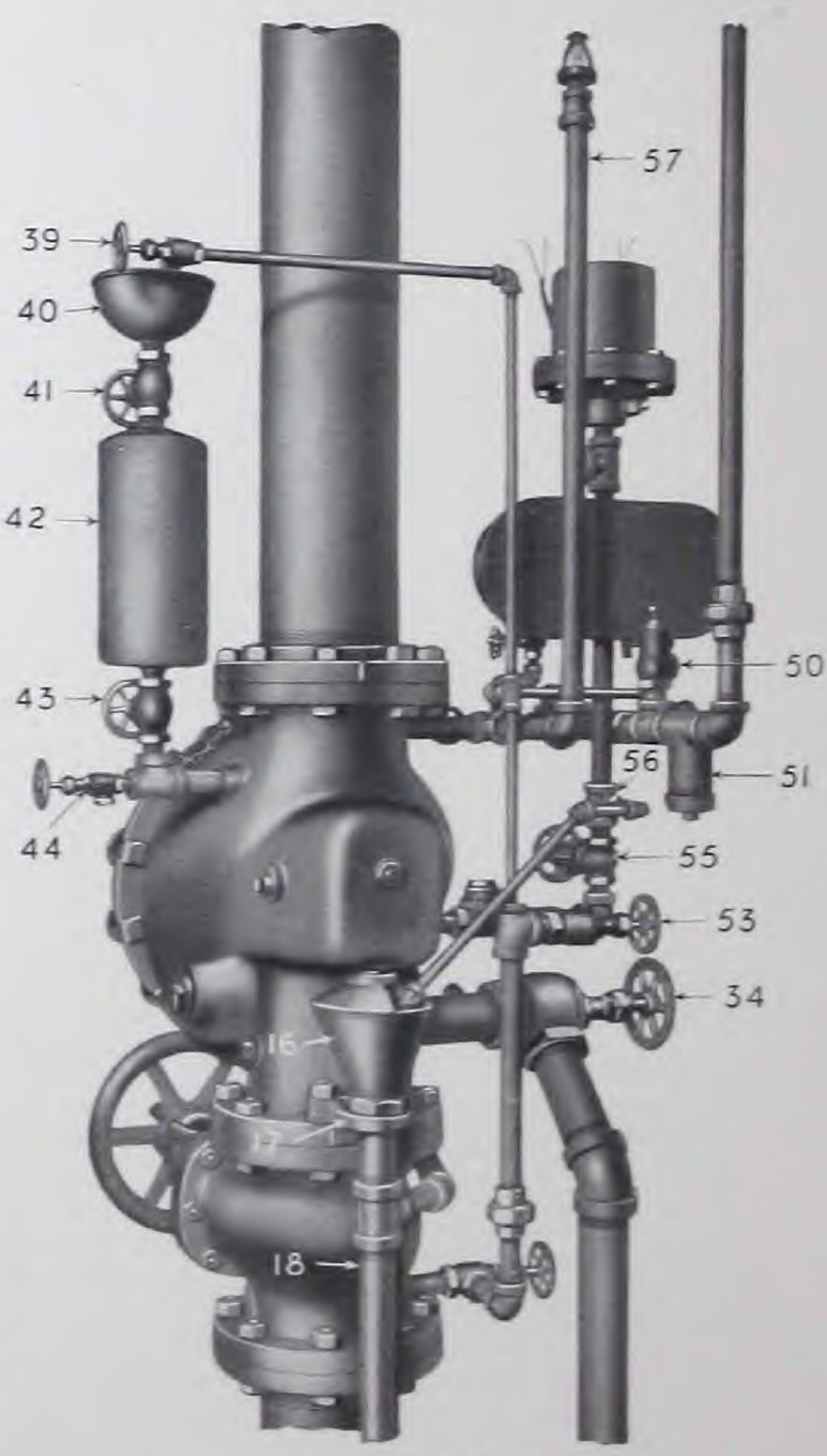


Fig. D

We can no longer furnish replacement Dry-Pipe Valves, Model "D", in the 6-inch size; or furnish repair parts of either 3-inch or 6-inch sizes except as noted on pages 84 to 86.

When ordering parts of the Grinnell Dry-Pipe Valve, Model "D", for replacement be sure to indicate Page Number, Article Number and Booklet Edition Number. (This is the Fourth Edition).

The Grinnell Dry-Pipe Valve, Model "D"

Various Parts of Valve and Alarms

(The following parts are standard in all Insurance Jurisdictions)

1—(Figs. A, B) Dry-Pipe Valve Body.

2—(Figs. A, B) Hand-Hole Cover which gives access to the interior of the Dry-Pipe Valve for cleaning and setting.

3—(Figs. A, B) Bronze Water Seat.

4—(Figs. A, B) Ball Jointed Bronze Clapper which closes the Water Seat.

5—(Figs. A, B) Babbit Air Seat.

6—(Figs. A, B) Rubber Diaphragm which closes Air Seat 5.

7—(Figs. A, B) Centre Valve Casting which carries the Rubber Diaphragm 6 and Bronze Clapper 4.

8—(Figs. A, B) Centre Valve Arms to which the Centre Valve Casting 7 is bolted.

9—(Figs. A, B) Bronze Hinge Pin about which the parts 4-6-7 and 8 rotate as one piece, forming the essential moving member of the Dry-Pipe Valve.

10—(Figs. A, B) Latch Weight which falls at a slight opening of the Clapper 4 and prevents reseating of Valve by engaging Facings 14 and 15.

11—(Figs. A, B) Drip Valve fastened to Latch Weight 10.

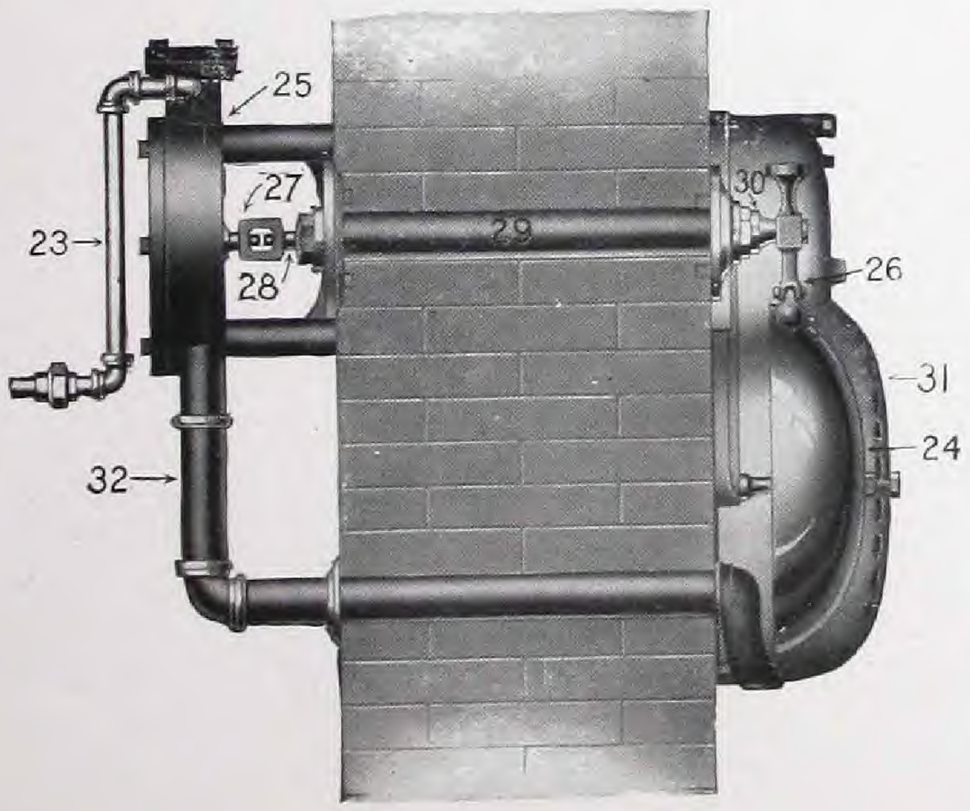


Fig. E.

NOTE: The Old Style Water Motor as illustrated above was installed with many of the Model "D" Valves. On the later installations the Model "A" Water Motor Alarms were used, as illustrated with the Model "E" Valves on page 71.

12—(Figs. A, B) Drip Valve Seat which drains the Intermediate Chamber or space between Air and Water Seats, allowing any slight leakage of water past Water Seat 3 to flow into Drip Funnel 16, but is automatically closed by Drip Valve 11 when Dry-Pipe Valve operates.

13—(Figs. A, B) Latch Weight Guide to limit side movement of Latch Weight 10.

14—(Figs. A, B) Centre Valve Facing for Latch.

15—(Figs. A, B) Latch Weight Facing which engages Centre Valve Facing 14 when Latch Weight 10 falls and prevents reseating of the Centre Valve.

16—(Figs. A, B, D) Drip Funnel.

17—(Figs. A, B, D) Drip Funnel Support.

18—(Figs. A, B, D) Drip Pipe from Drip Funnel 16 and Drain Cup 43.

19—(Fig. C) Electric Alarm Circuit Closer.

20—(Fig. C) Wires for connecting the Circuit Closer 19 with the Electric Gong and Electric Battery.

21—(Figs. B, C) ¾-inch Galvanized Pipe which connects the Intermediate Chamber of the Dry-Pipe Valve with the Electric Circuit Closer 19. When the Dry-Pipe Valve operates, the full water pressure enters into the Pipe 21 to the Electric Circuit Closer 19, and the pressure upon a flexible metal diaphragm closes the electric circuit and sounds a continuous Electric Alarm.

23—(Fig. E) ¾-inch Galvanized Pipe connecting the Intermediate Chamber of Dry-Pipe Valve with the Water Motor 25 through the Pipe 21 and Tee 22.

24—(Fig. E) Alarm Gong.

25—(Fig. E) Water Motor operating Alarm Gong.

26—(Fig. E) Gong Striker.

27, 28, 29, 30—(Fig. E) Connecting Parts to Water Motor Alarm Gong.

31—(Fig. E) C. I. Hood placed over Alarm Gong.

32—(Fig. E) 1½-inch pipe for draining Water Motor 25.

33—(Fig. C) Main Gate Valve controlling water supply to system.

34—(Figs. C, D) Draw-off Valve and Pipe for emptying the entire system of water after Dry-Pipe Valve has tripped; can also be used as a Test Valve to determine the volume of flow in the supply pipe.

35—(Fig. C) Pressure Gauge to indicate the pressure of Water in the supply pipe.

36—(Fig. C) Pressure Gauge to indicate the pressure of Air in the sprinkler system.

The Grinnell Dry-Pipe Valve, Model "D"

Various Parts of Valve and Alarms (Continued)

37 and 38—(Fig. C) Side Outlet Globe Valves which may be closed and used for testing the Pressure Gauges by removing the plugs and attaching Test Gauges.

39—(Fig. D) ¼-inch Angle Valve controlling supply of water for priming Dry-Pipe Valve.

40—(Figs. C, D) Funnel for priming Dry-Pipe Valve.

41—(Figs. C, D) ¾-inch Globe Valve used as Upper Priming Valve, to be open when first priming the Dry-Pipe Valve after setting but kept closed at all other times except when re-filling Priming Chamber 42.

42—(Figs. C, D) Priming Chamber.

43—(Figs. C, D) ¾-inch Globe Valve used as Lower Priming Valve, to be kept open at all times except when re-filling Priming Chamber 42 when air pressure is on the system.

44—(Fig. D) ¼-inch Angle Valve used as a Test Valve to see that priming water is up to this level.

45—(Fig. C) ¼-inch Angle Valve used as a Test Valve to see that the system is free from water down to the level of the air inlet. This valve should normally be kept closed.

46—(Fig. C) ½-inch Angle Valve used to drain the body of the Dry-Pipe Valve.

47—(Fig. C) Drain Cup.

48—(Fig. C) ¾-inch Angle Valve controlling air supply from Air Compressor.

49—(Fig. C) ¾-inch Check Valve to hold air in system while air is being pumped in.

50—(Fig. D) ¾-inch Brass Relief Valve in connection from Air Compressor to avoid the possibility of creating too great an air pressure on top of Dry-Pipe Valve. This Relief Valve is normally set at 40 pounds air pressure when water pressure does not exceed 100 pounds.

51—(Figs. C, D) ¾-inch Sediment Strainer to prevent scale or foreign matter from being carried into Dry-Pipe Valve and injuring the seats of Valves 48, 49 and 50.

52—(Fig. C) ¾-inch Angle Valve supplied from beneath seat of Valve 33 and controls water to Pressure Gauge 35 and Priming Valve 39, also water for Testing Alarms.

53—(Fig. D) ¾-inch Angle Valve to test either the Electric Alarm or the Water Motor Alarm, or both, without operating the Dry-Pipe Valve. This Valve should normally be kept closed.

54—(Fig. C) ¾-inch Check Valve so placed as to prevent the flooding of Intermediate Chamber when Alarms are tested with Valve 53.

57—(Fig. D) ¾-inch Pipe to supply Sprinkler in Valve Room when Sprinkler is necessary. When Sprinkler is not necessary, plug ¾-inch outlet of cross which supplies Air Pressure Gauge 36.

All Insurance Jurisdictions except the Central Actuarial Bureau

The following parts, shown in Figures C and D on page 64, are a part of the alarm and alarm drain connections to meet the requirements of all Insurance Companies except the Central Acturial Bureau.

22—(Fig. C) Tee with ¾-inch outlet in Pipe 21. Outlet to be plugged when the Water Motor Alarm is not used.

55—(Figs. C, D) ¾-inch O. S. & Y. Gate Valve to shut off Alarms after Dry-Pipe Valve has operated and necessary Alarm has been given. This valve should be *Sealed Open.*

56—(Fig. D) ¼-inch Bronze Vent Bushing with $\frac{3}{32}$-inch drilled hole to automatically drain the alarm piping after testing Alarms or after shutting off Alarms.

(See Notes at bottom of Page 64)

The Grinnell Dry-Pipe Valve, Model "D"

Various Parts of Valve and Alarms (Continued)

Jurisdiction of the Central Actuarial Bureau

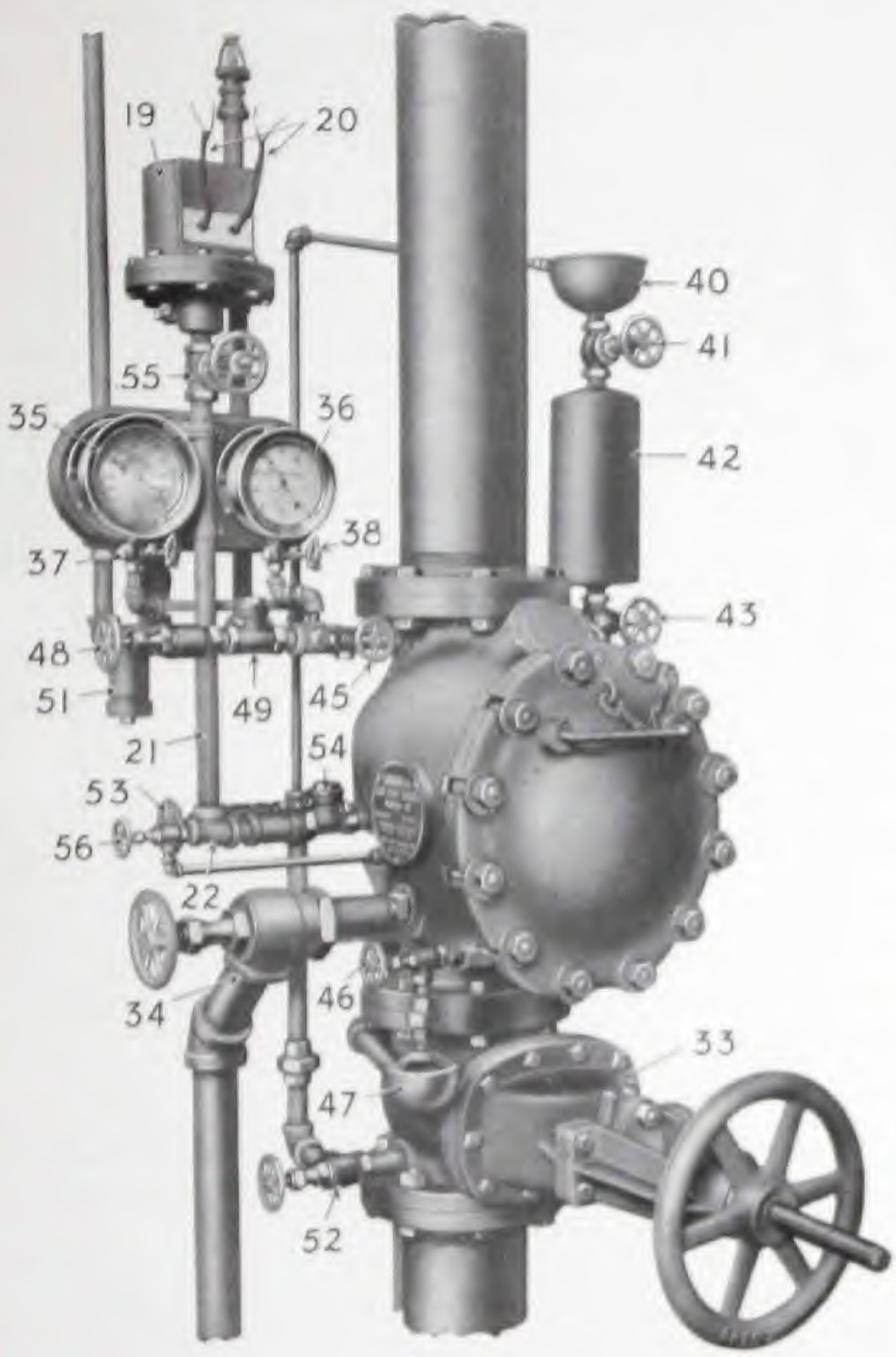


Fig. F

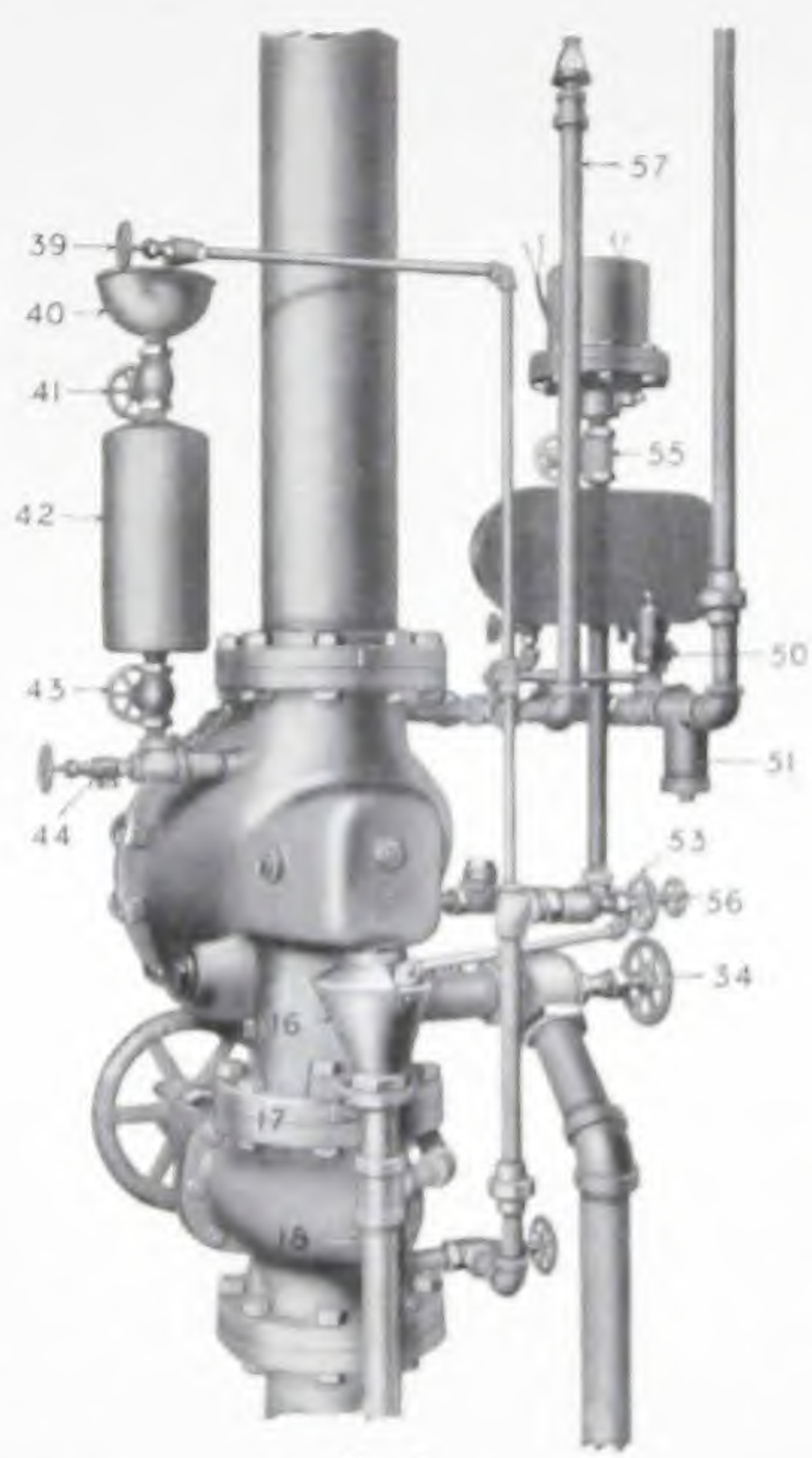


Fig. G

The illustrations, F, G and H, show the Grinnell Dry-Pipe Valve, Model "D" with alarm and alarm drain connections to meet the requirements of the Central Actuarial Bureau.

22—(Figs. F, H) Tee with ¼-inch outlet connecting to Valve 56.

22-A—(Fig. H) ¾-inch Tee installed between Tee 22 and Tee connecting with Valve 53, when both Electric and Water Motor Alarms are used. When more than one Dry-Pipe Valve is connected to one Water Motor Alarm and Electric Alarm is also used, a ¾-inch Check Valve without hole in clapper should be installed between Tees 22 and 22-A.

55—(Figs. F, G, H) ¾-inch O. S. & Y. Gate Valve to shut off Alarm after Dry-Pipe Valve has operated and necessary Alarm has been given. When both Water Motor and Electric Alarms are used, O. S. & Y. Gate Valves must be installed in each line. These valves should be *Sealed Open*.

56—(Figs. F, G, H) ¼-inch Angle Valve to drain Alarm Piping after testing Alarm or after Dry-Pipe Valve has operated. This Valve should normally be sealed closed.

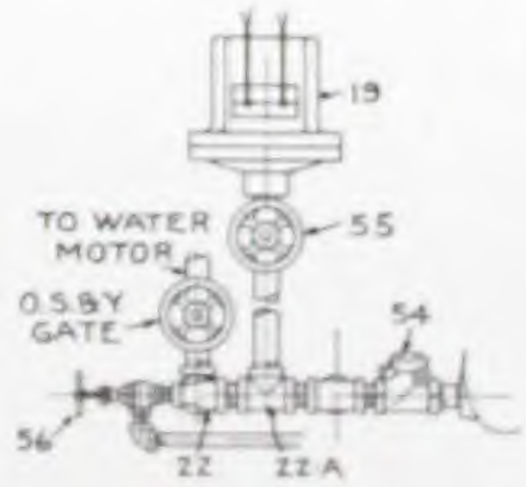


Fig. H

(See Notes at bottom of Page 64)

The Grinnell Dry-Pipe Valve, Model "D"

Instructions for Maintenance

The chief problem in maintaining a dry-pipe system is to keep the air pressure in correct relation to the pressure of the water supply.

The construction of the Dry-Pipe Valve is such that one pound of air pressure will hold back approximately six pounds of water pressure.

In practice the relation between water and air pressures should be maintained as follows:

WATER PRESSURE	AIR PRESSURE	
MAXIMUM	NOT LESS THAN	NOT MORE THAN
50 lbs.	15 lbs.	25 lbs.
75 "	20 "	30 "
100 "	25 "	35 "
125 "	30 "	45 "
150 "	35 "	50 "

(In using above table the maximum water pressure to which the system is liable to be subjected should be taken instead of the normal pressure. Fire pumps give at least 100 lbs. pressure.)

If air pressure is kept on the system according to the above table, the Dry-Pipe Valve will not trip unnecessarily.

If water should get into the dry part of the equipment, either through accident or the opening of sprinklers in a fire, the system should be emptied, and Dry-Pipe Valve reset as follows:

1 Close the Main Gate Valve 33 in the Supply Pipe under the Dry-Pipe Valve.

2 Open Draw-off Valve 34, closing it when water has ceased to run.

3 Open Drain Valves and Vents throughout the system, closing them when water has ceased to run.

4 Open Valve 46 to drain the body of the Dry-Pipe Valve.

5 Remove Hand-Hole Cover 2 by loosening bolts around the outside, and with a piece of clean waste carefully clean the Air Seat 5, Rubber Diaphragm 6, Water Seat 3 and Clapper 4, *otherwise they may be ruined.*

NEVER APPLY GREASE, TALLOW OR ANY OILY SUBSTANCE TO THESE PARTS.

6 Push the Centre Valve Casting 7 slowly from you until it drops into place; then raise the Latch Weight 10, by means of the projection which extends into the Drip Funnel 16, until the Centre Valve becomes thoroughly seated.

7 Replace Hand-Hole Cover 2 and gasket and tighten all bolts.

8 Close Valve 46 and open Valves 41, 43 and 45. Fill the body of Dry-Pipe Valve through Funnel 40, by opening Valve 39, until water flows out at Valve 45, showing that water is up to the proper level. Close Valves 43 and 45. Fill Priming Chamber 42 until water remains in Funnel 40, then close Valves 39 and 41, and open Valve 43.

9 Open Valve 48 and pump a few pounds of air pressure into the system.

10 Open Drain Valves separately in order to force water from low points of the system. Close all Drain Valves as soon as dry air appears at the various points and replace plugs in valve outlets.

11 Pump sufficient air into the Sprinkler System to hold the Dry-Pipe Valve closed against the water pressure in the supply pipe. (See Air Pressure Table above.) Close Valve 48.

12 Open Main Gate Valve 33 slowly and observe if water leaks past Drip Valve 11 into the Drip Funnel 16. If there is no leakage, Dry-Pipe Valve Seats 3 and 5 are tight. The Main Gate Valve 33 should then be opened wide.

WATER MUST NOT BE ALLOWED TO STAND IN THE DRY-PIPE SYSTEM ABOVE THE ¾" AIR INLET 48 AS IT MIGHT FREEZE OR EXERT PRESSURE ON THE DIAPHRAGM 6. (See paragraph 2, Priming Water Level, under Inspection on opposite page.)

Be Sure that your Air Compressor is Always in Good Working Order.

Operation of Dry-Pipe Sprinkler System

When the air pressure in the system is relieved by the opening of a Sprinkler, the water pressure under Seat 3 causes the Clapper 4 to be raised allowing the Latch Weight 10 to fall and close the Drip Valve 11. The Intermediate Chamber fills with water, the pressure of which rotates the Centre Valve 7 about the Hinge Pin 9 to its open position against the Hand-Hole Cover giving a full-sized unobstructed passage for the water. The pressure of water filling Pipe 21 causes an alarm to be sounded.

The Grinnell Dry-Pipe Valve, Model "D"

Instructions for Maintenance (Continued)

Inspection

Water Supply:

See that Controlling Valves are properly open.

Air Pressure:

See that proper air pressure is maintained on the system.

Priming Water Level:

1 Open Valve 44 slightly to see that priming water is up to this level, then close Valve 44. If water does not appear, add priming water in the following manner: Close Valve 43, open Valves 41 and 39 and fill Chamber to level of Funnel 40. Close Valves 39 and 41, and open Valve 43; this will automatically reprime the Dry-Pipe Valve. Repeat this process if necessary until water appears at Valve 44 when slightly opened. Leave Priming Chamber 42 filled with water, Valve 41 closed and Valve 43 open, in order that the full capacity of the reservoir will be available to automatically follow up any leakage at Air Seat 5.

2 Open Valve 45 slightly to see if the system of sprinklers and piping is free of water down to the level of Air Inlet 48. If water appears, close Valve 45 and draw off a small quantity of water through Valve 46. Repeat test, closing Valve 45 when air appears.

Drain Valves at Low Points:

As water from condensation may settle at the low points of the system it will be prudent to partially open all Drain Valves occasionally throughout the system and if water appears draw it off, closing the Valves as soon as air appears.

Latch Weight and Drip Valve:

Observe whether there is any leakage of water through Drip Valve 11 into Drip Funnel 16. See that Latch Weight 10 is free to move upward by exerting pressure on extension of Drip Valve 11. If no water appears, Air Seat 5 and Water Seat 3 are tight.

Testing of Alarms—All Insurance Jurisdictions except the Central Actuarial Bureau:

Open Valve 53 and thus allow water pressure from supply pipe, controlled by Valve 52, to enter Circuit Closer 19, or Water Motor 25 if installed, and sound a continuous alarm if in working order. After test has been made, Valve 53 should be closed.

Testing of Alarms—Central Actural Bureau:

Open Valve 53 and thus allow water pressure from supply pipe, controlled by Valve 52, to enter Circuit Closer 19, or Water Motor 25 if installed, and sound continuous alarm if in working order. After test has been made, Valve 53 should be closed and Valve 56 opened to drain Alarm Piping. Close Valve 56 after water ceases to flow.

Important

In our opinion dry-pipe systems should not be filled with water during warm weather.

Air Pressure should be maintained on Dry-Pipe Systems throughout the year unless changed by consent of the Inspection Department having Jurisdiction.

All important valves are left sealed in correct positions when installation is first completed and turned over to the owner.

It is recommended that these seals be replaced by owner, after valves are operated, by seals or straps to insure their being left in correct position for the proper operation of the equipment controlled by the Dry-Pipe Valve.

The Grinnell Dry-Pipe Valve, Model "E"

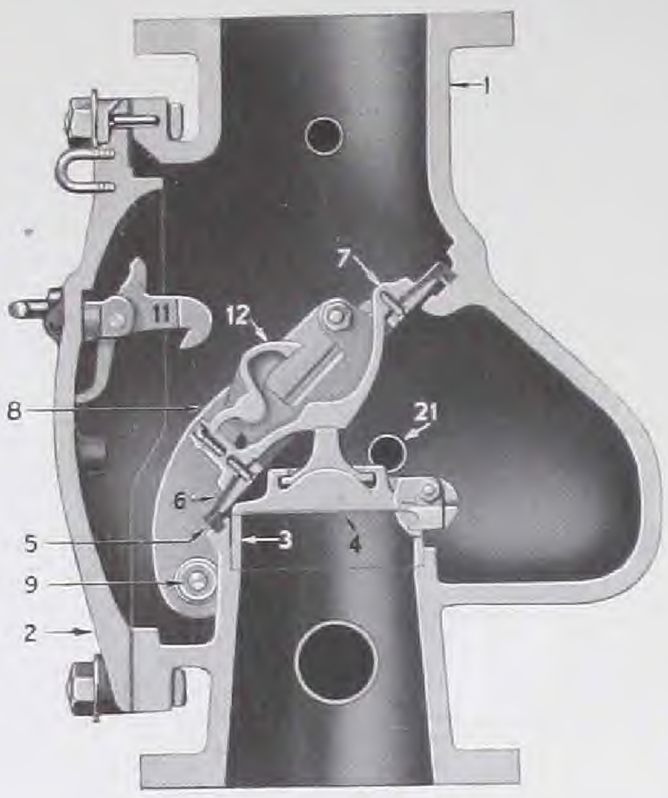


Fig. A—Closed

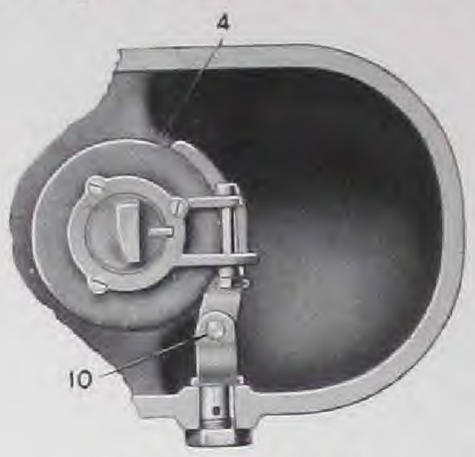


Fig. C. Closed

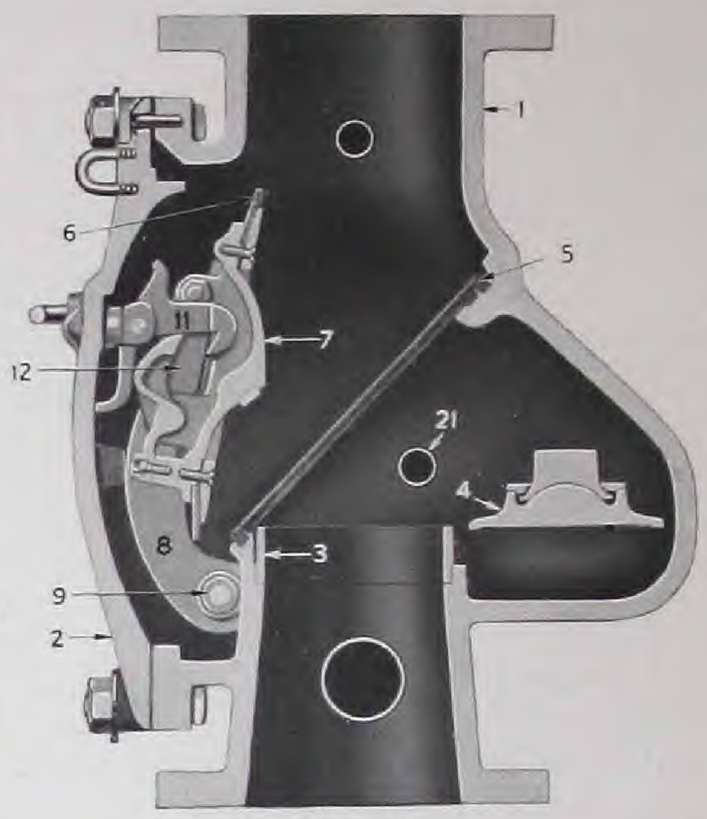


Fig. B—Open

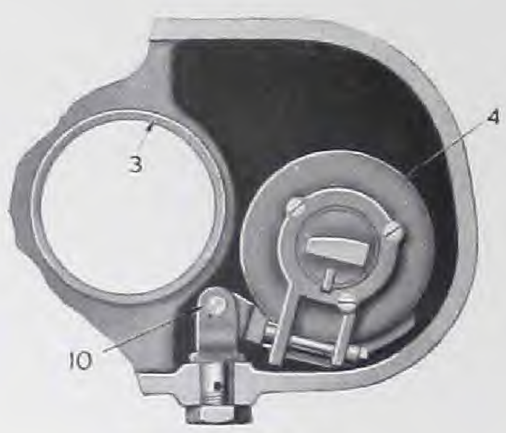


Fig. E. Open

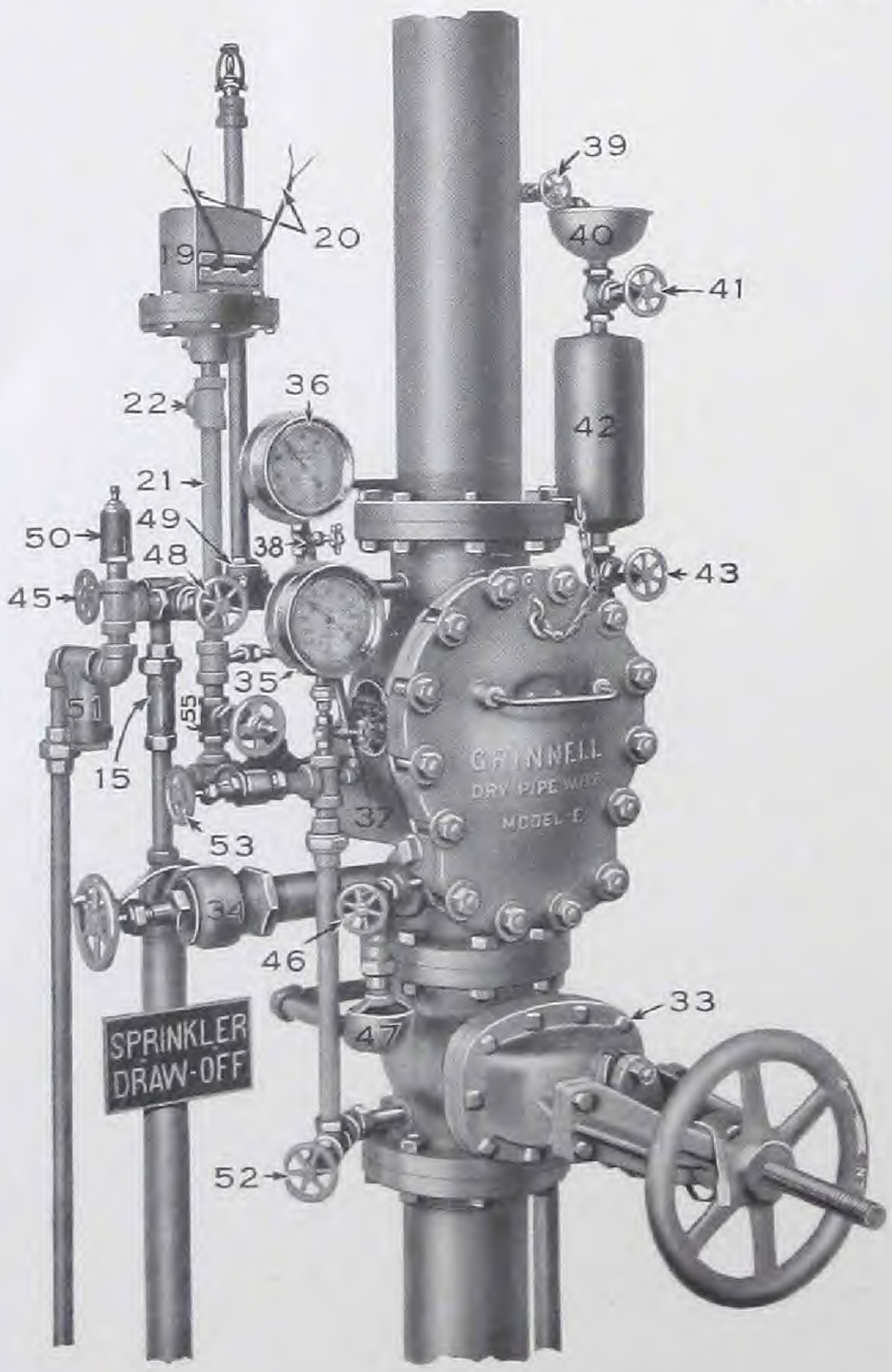


Fig. F

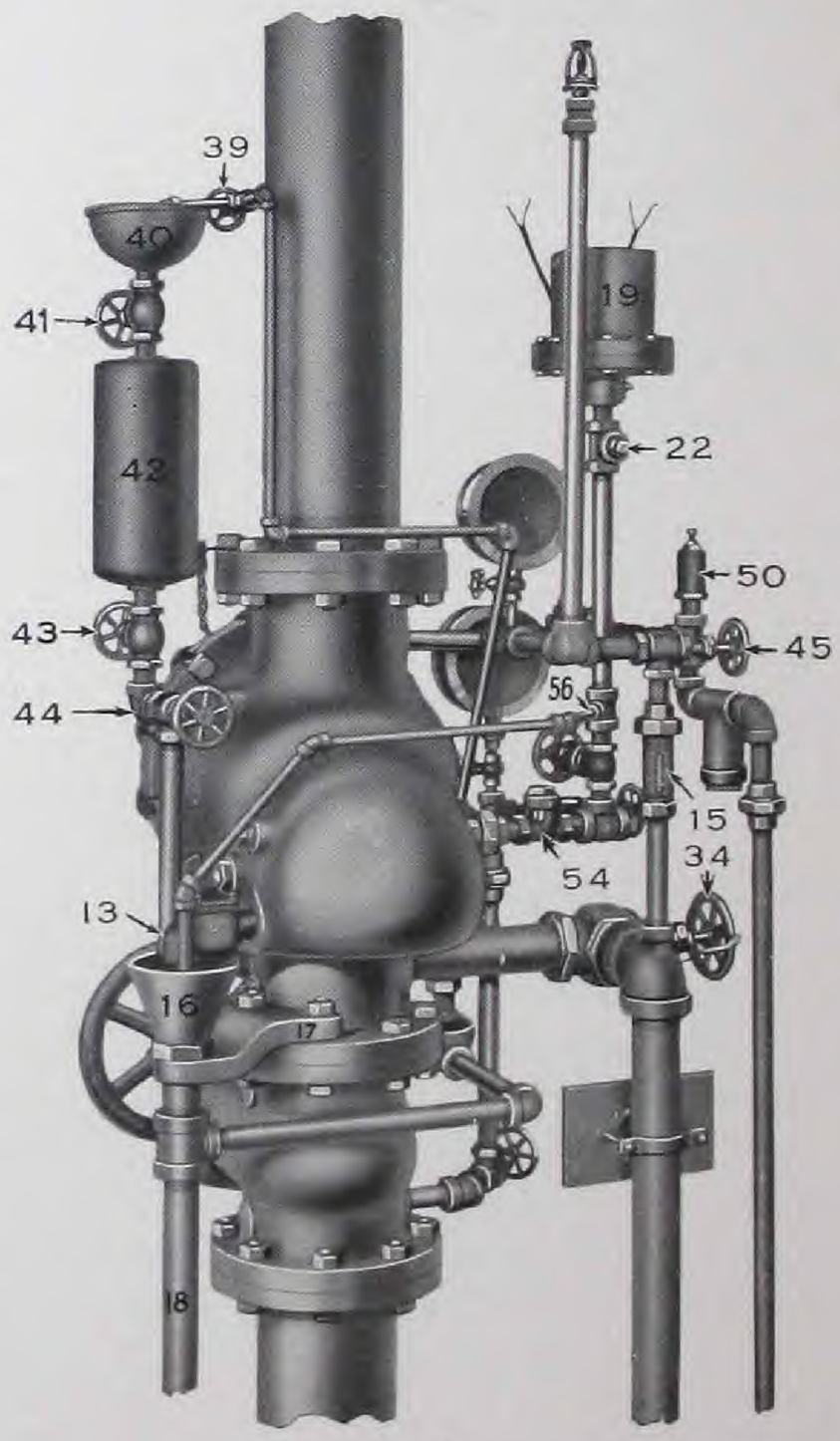


Fig. G

See pages 84 to 86 for replacement parts of Dry-Pipe Valves, Circuit Closers and Water Motor Alarms which can be furnished.

When ordering parts of the Grinnell Dry-Pipe Valve, Model "E", for replacement be sure to indicate Page Number, Article Number and Booklet Edition Number (This is the Fourth Edition.)

The Grinnell Dry-Pipe Valve, Model "E"

Various Parts of Valve and Alarms

The following parts are standard in all Insurance Jurisdictions

1—(Figs. A, B) Dry-Pipe Valve Body.

2—(Figs. A, B) Hand-Hole Cover which gives access to the interior of the Dry-Pipe Valve for cleaning and setting.

3—(Figs. A, B) Bronze Water Seat.

4—(Figs. A, B, C, E) Ball Jointed Bronze Clapper which closes the Water Seat.

5—(Figs. A, B) Tin Air Seat.

6—(Figs. A, B) Rubber Diaphragm which closes Air Seat 5.

7—(Figs. A, B) Centre Valve Casting which carries the Rubber Diaphragm 6.

8—(Figs. A, B) Centre Valve Arms to which the Centre Valve Casting 7 is bolted.

9—(Figs. A, B) Bronze Hinge Pin about which the parts 6-7 and 8 rotate as one piece.

10—(Figs. C, E) Bronze Hinge Pin about which the parts of Clapper 4 rotate as one piece.

11—(Figs. A, B) Latch which prevents center valve from reseating after Dry-Pipe Valve operates.

12—(Figs. A, B) Latch Stop which engages with Latch 11 when Dry-Pipe Valve operates.

13—(Figs. G, J) Drip Check Valve which drains the Intermediate Chamber or space between Air and Water Seats, allowing any slight leakage of water past Water Seat 3 to flow into Drip Funnel 16, but is automatically closed when Dry-Pipe Valve operates.

15—(Figs. F, G, I, J) Sight Drip to note water flow through Test Valve 45.

16—(Figs. G, J) Drip Funnel.

17—(Figs. G, J) Drip Funnel Support.

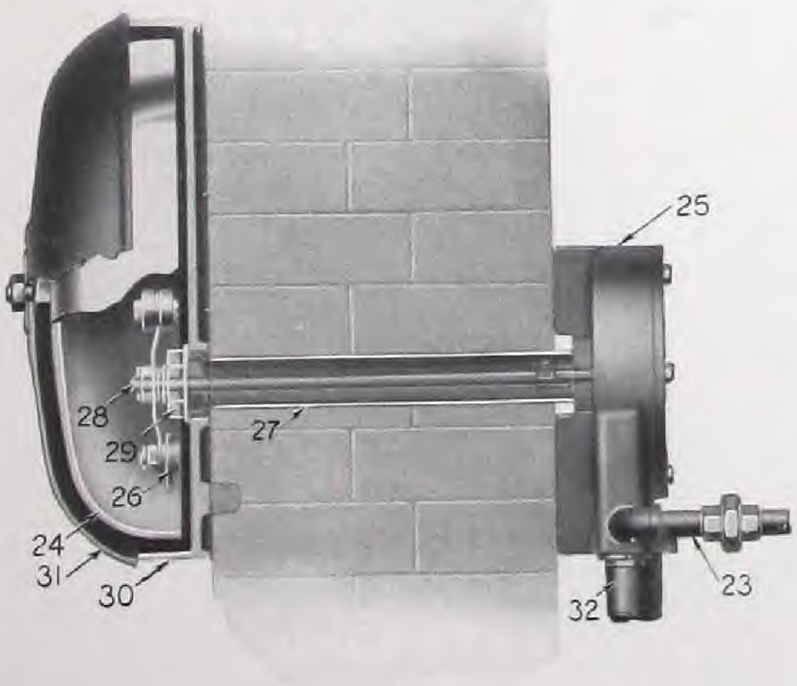


Fig. H

18—(Figs. G, J) Drip Pipe from Drip Funnel 16 and Drain Cup 47.

19—(Figs. F, I) Electric Alarm Circuit Closer.

20—(Figs. F, I) Wires for connecting the Circuit Closer 19 with the Electric Gong and Electric Battery.

21—(Figs. B, F, I) ¾-inch Galvanized Pipe which connects the Intermediate Chamber of the Dry-Pipe Valve with the Electric Circuit Closer 19. When the Dry-Pipe Valve operates, the full water pressure enters into the Pipe 21 to the Electric Circuit Closer 19, and the pressure upon a flexible metal diaphragm closes the electric circuit and sounds a continuous Electric Alarm.

23—(Fig. H) ¾-inch Galvanized Pipe connecting the Intermediate Chamber of Dry-Pipe Valve with the Water Motor 25 through the Pipe 21 and Tee or Cross 22.

24—(Fig. H) Alarm Gong.

25—(Fig. H) Water Motor operating Alarm Gong.

26—(Fig. H) Gong Striker.

27, 28, 29—(Fig. H) Connecting Parts to Water Motor Alarm Gong.

30—(Fig. H) Gong Frame.

31—(Fig. H) C. I. Hood placed over Alarm Gong.

32—(Fig. H) 1½-inch pipe for draining Water Motor 25.

33—(Figs. F, I) Main Gate Valve controlling water supply to system.

34—(Figs. F, G, I, J) Draw-off Valve and Pipe for emptying the entire system of water after Dry-Pipe Valve has tripped; can also be used as a Test Valve to determine the volume of flow in the supply pipe.

35—(Figs. F, I) Pressure Gauge to indicate the pressure of Water in the supply pipe.

36—(Figs. F, I) Pressure Gauge to indicate the pressure of Air in the sprinkler system.

37 and 38—(Figs. F, I) Side Outlet Globe Valves which may be closed and used for testing the Pressure Gauges by removing the plugs and attaching Test Gauges.

39—(Figs. G, J) ¼-inch Angle Valve controlling supply of water for priming Dry-Pipe Valve.

40—(Figs. F, G, I, J) Funnel for priming Dry-Pipe Valve.

41—(Figs. F, G, I, J) ¾-inch Globe Valve used as Upper Priming Valve, to be open when first priming the Dry-Pipe Valve after setting but kept closed at all other times except when re-filling Priming Chamber 42.

42—(Figs. F, G, I, J) Priming Chamber.

The Grinnell Dry-Pipe Valve, Model "E"

Various Parts of Valve and Alarms (Continued)

43—(Figs. F, G, I, J) ¾-inch Globe Valve used as Lower Priming Valve, to be kept open at all times except when re-filling Priming Chamber 42 with air pressure on the system.

44—(Figs. G, J) ¾-inch Angle Valve used as a Test Valve to see that priming water is up to this level, also as an Auxiliary Draw-off Valve. This valve should normally be kept closed.

45—(Figs. F, I) ¾-inch Angle Valve used as a Test Valve to see that the system is free from water down to the level of the air inlet, also as an Auxiliary Draw-off Valve. This valve should normally be kept closed.

46—(Figs. F, I) ½-inch Angle Valve used to drain the body of the Dry-Pipe Valve.

47—(Figs. F, I) Drain Cup.

48—(Figs. F, I) ¾-inch Globe Valve controlling air supply from Air Compressor.

49—(Figs. F, I) ¾-inch Check Valve to hold air in system while air is being pumped in.

50—(Figs. G, J) ¾-inch Brass Relief Valve in connection from Air Compressor to avoid the possibility of creating too great an air pressure on top of Dry-Pipe Valve. This Relief Valve is normally set at 40 pounds air pressure when water pressure does not exceed 100 pounds.

51—(Figs. F, I) ¾-inch Sediment Strainer to prevent scale or foreign matter from being carried into Dry-Pipe Valve and injuring the seats of Valves 48, 49 and 50.

52—(Figs. F, I) ¾-inch Angle Valve supplied from beneath seat of Valve 33 and controls water to Pressure Gauge 35 and Priming Valve 39, also water for testing Alarms.

53—(Figs. G, J) ¾-inch Angle Valve to test either the Electric Alarm or the Water Motor Alarm, or both, without operating the Dry-Pipe Valve. This Valve should normally be kept closed.

54—(Figs. G, K) ¾-inch Check Valve so placed as to prevent the flooding of Intermediate Chamber when Alarms are tested with Valve 53.

All Insurance Jurisdictions except the Central Actuarial Bureau

The following parts, shown in Figures F and G on page 70, are a part of the alarm and alarm drain connections to meet the requirements of all Insurance Companies except the Central Actuarial Bureau:

22—(Figs. F, G) Tee with outlet for connection to Water Motor. Outlet to be plugged when Water Motor is not used.

55—(Fig. F) ¾-inch O. S. & Y Gate Valve to shut off Alarms after Dry-Pipe Valve has operated and necessary Alarm has been given. This valve should be *Sealed Open.*

56—(Fig. G) ¼-inch bronze Vent Bushing with ⅛-inch drilled hole to automatically drain the alarm piping after testing Alarms or after shutting off Alarms.

Jurisdiction of the Central Actuarial Bureau

The following parts, shown in Figures I, J and K on opposite page, are a part of the alarm and alarm drain connections to meet the requirements of the Central Actuarial Bureau:

22—(Figs. J, K) Special Cross with outlet for connection to Water Motor. Outlet to be plugged when Water Motor is not used.

22-A—(Fig. K) ¾-inch Elbow installed beyond Cross 22 when both Electric and Water Motor Alarms are used. When more than one Dry-Pipe Valve is connected to one Water Motor Alarm and Electric Alarm is also used, the Elbow 22-A should be changed to a Cross, and a ¾-inch Check Valve should be installed between Crosses 22 and 22-A; and ¼-inch Angle Valve 56-A provided under Valve controlling supply to Water Motor to drain Alarm Piping to Water Motor.

55—(Figs. I, J, K) ¾-inch O. S. & Y. Gate Valve to shut off Alarm after Dry-Pipe Valve has operated and necessary Alarm has been given. When both Water Motor and Electric Alarms are used O. S. & Y. Gate Valves must be installed in each line. These valves should be *Sealed Open.*

56—(Figs. I. J, K) ¼-inch Angle Valve to drain Alarm Piping after testing Alarm or after Dry-Pipe Valve has operated. This Valve should normally be sealed closed.

56-A—(Fig. K) ¼-inch Angle Valve to drain Water Motor Alarm Piping after testing Alarm or after Dry-Pipe Valve has operated. This Valve should normally be sealed closed.

(See Notes at bottom of Page 70)

The Grinnell Dry-Pipe Valve, Model "E"

Various Parts of Valve and Alarms (Continued)

Jurisdiction of Central Actuarial Bureau

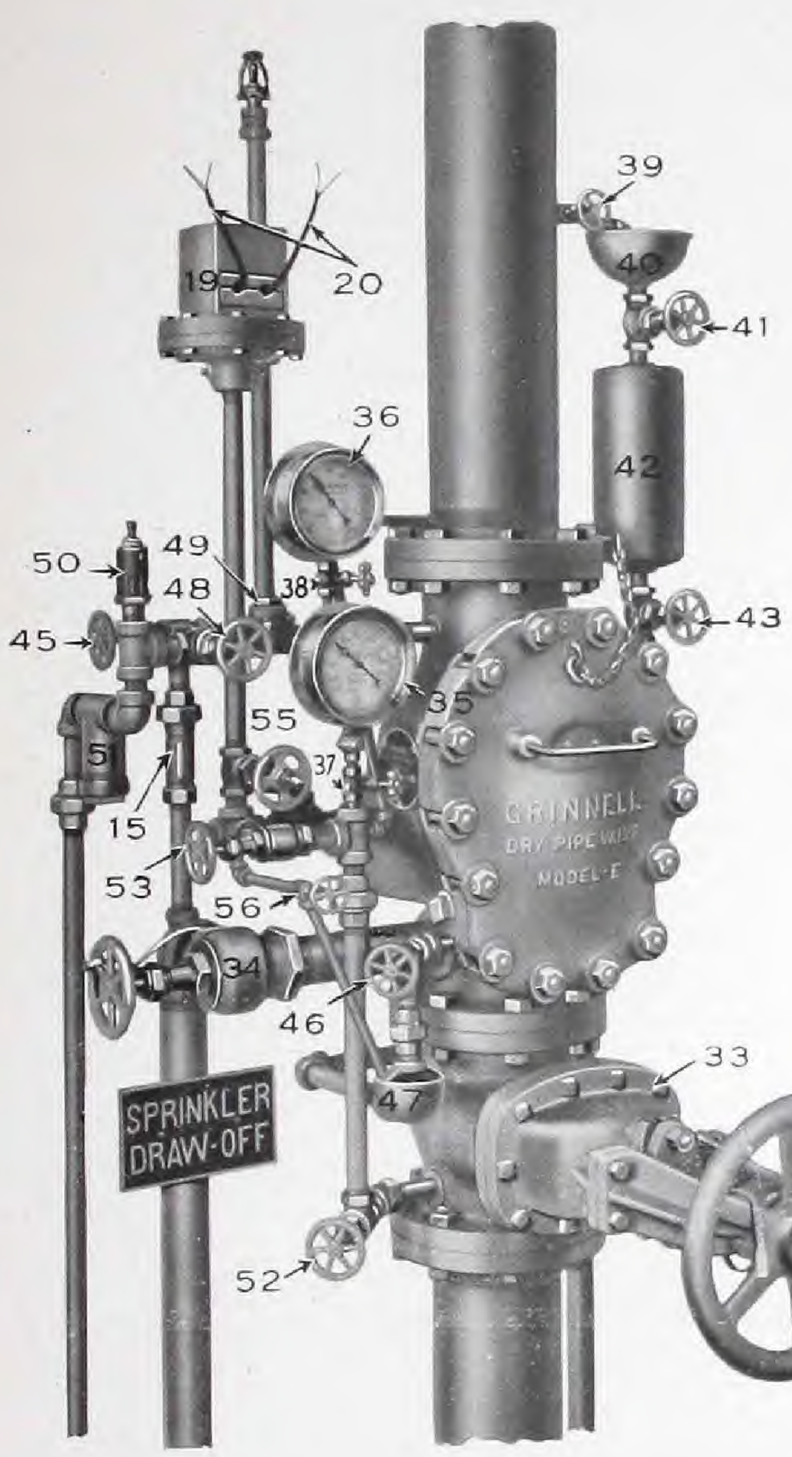


Fig. I

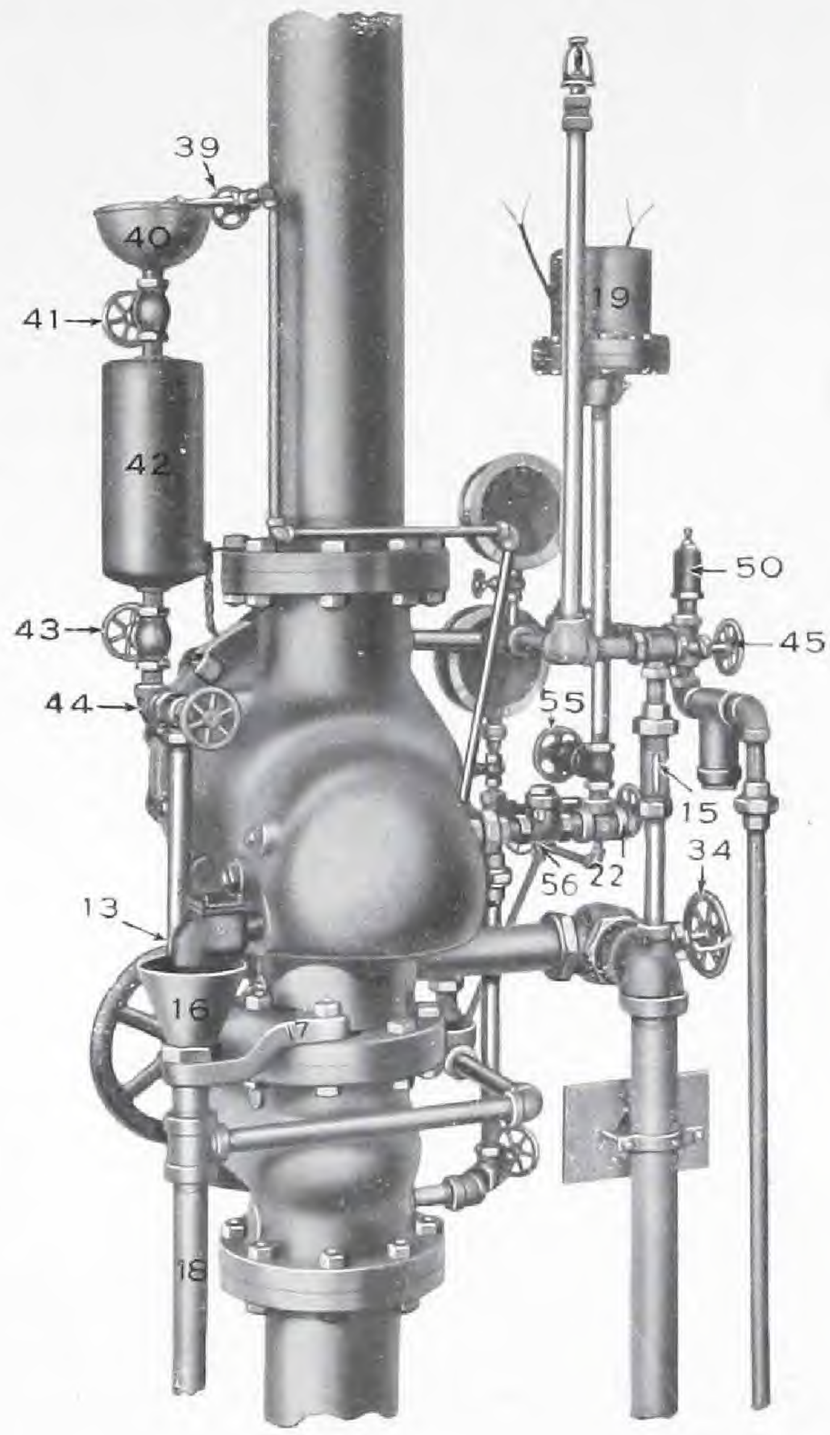
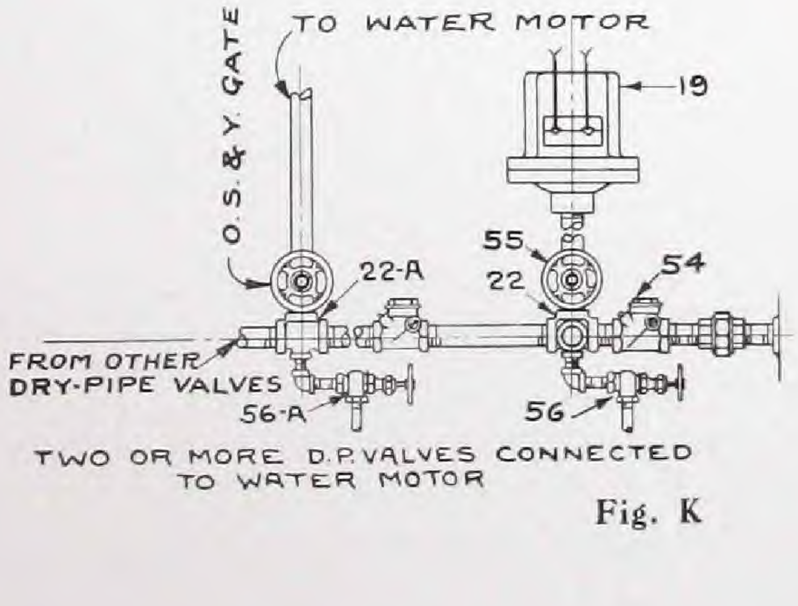


Fig. J



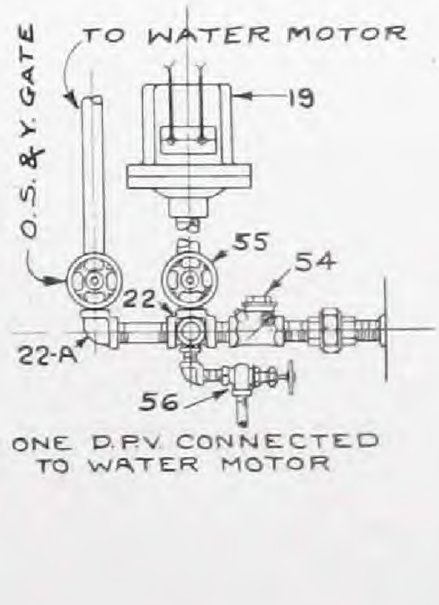


Fig. K

The Grinnell Dry-Pipe Valve, Model "E"

Instructions for Maintenance

The chief problem in maintaining a dry-pipe system is to keep the air pressure in correct relation to the pressure of the water supply.

The construction of the Dry-Pipe Valve is such that one pound of air pressure will hold back approximately six pounds of water pressure.

In practice the relation between water and air pressures should be maintained as follows:

WATER PRESSURE	AIR PRESSURE	
MAXIMUM	NOT LESS THAN	NOT MORE THAN
50 lbs.	15 lbs.	25 lbs.
75 "	20 "	30 "
100 "	25 "	35 "
125 "	30 "	45 "
150 "	35 "	50 "

(In using above table the maximum water pressure to which the system is liable to be subjected should be taken instead of the normal pressure. Fire pumps give at least 100 lbs. pressure.)

If air pressure is kept on the system according to the above table, the Dry-Pipe Valve will not trip unnecessarily.

If water should get into the dry part of the equipment, either through accident or the opening of sprinklers in a fire, the system should be emptied, and Dry-Pipe Valve reset as follows:

1 Close the Main Gate Valve 33 in the Supply Pipe under the Dry-Pipe Valve.

2 Open Draw-off Valves 34, 44 and 45, closing them when water has ceased to run.

3 Open Drain Valves and Vents throughout the system, closing them when water has ceased to run.

4 Open Valve 46 to drain the body of the Dry-Pipe Valve.

5 Press in on plunger of Drip Check Valve 13 to force the clapper from its seat and drain the Intermediate Chamber of the Dry-Pipe Valve.

6 Remove Hand-Hole Cover 2 by loosening bolts around the outside. With a piece of clean cloth carefully clean the Air Seat 5, Rubber Diaphragm 6, Water Seat 3 and Clapper 4, also machined surfaces where plate on Center Valve Casting 7 bears on top of Clapper 4, making certain they are left free from dirt, scale, lint, etc., *otherwise they may be seriously damaged when the Dry-Pipe Valve is reset.*

NEVER APPLY GREASE, TALLOW OR ANY OILY SUBSTANCE TO THESE PARTS.

7 Lift Bronze Clapper 4 to clear Water Seat 3 and pull toward you until Clapper 4 sets centrally on Seat 3.

8 Push the Centre Valve Casting 7 slowly from you until it drops into place.

9 Replace Hand-Hole Cover 2 and gasket and tighten all bolts.

10 Close Valve 46 and open Valves 41, 43 and 45. Fill the body of Dry-Pipe Valve through Funnel 40, by opening Valve 39, until water flows out at Valve 45, showing that water is up to the proper level. Close Valves 43 and 45. Fill Priming Chamber 42 until water remains in Funnel 40, then close Valves 39 and 41, and open Valve 43.

11 Open Valve 48 and pump a few pounds of air pressure into the system.

12 Open Drain Valves separately in order to force water from low points of the system. Close all Drain Valves as soon as dry air appears at the various points and replace plugs in valve outlets.

13 Pump sufficient air into the Sprinkler System to hold the Dry-Pipe Valve closed against the water pressure in the supply pipe. (See Air Pressure Table above.) Close Valves 48 and 34.

14 Open Main Gate Valve 33 slowly and observe if water leaks past Drip Check Valve 13 into the Drip Funnel 16. If there is no leakage Dry-Pipe Valve Seats 3 and 5 are tight. The Main Gate Valve 33 should then be opened wide.

WATER MUST NOT BE ALLOWED TO STAND IN THE DRY-PIPE SYSTEM ABOVE THE ¾-INCH AIR INLET 48 AS IT MIGHT FREEZE OR EXERT PRESSURE ON THE DIAPHRAGM 6. (See paragraph 2, Priming Water Level, under Inspection on opposite page.)

The Grinnell Dry-Pipe Valve, Model "E"

Instructions for Maintenance (Continued)

Operation of Dry-Pipe Sprinkler System

When the air pressure in the system is relieved by the opening of a Sprinkler, the water pressure under Seat 3 causes the Clapper 4 to raise from Seat 3 on axis of hinge, which slightly raises the Center Valve 7 from Seat 5 and the flow of water throws the Clapper 4 off of Seat 3 and out of the way, leaving an unobstructed full size opening for the water.

The water fills the Intermediate Chamber, causing Center Valve 7 to rotate on Pin 9 until Latch 11 engages Latch Stop 12 by which Center Valve 7 is definitely held out of the water way.

This affords a full sized unobstructed passage for the water through the Dry-Pipe Valve, and the pressure of water filling Pipe 21 causes an alarm to be sounded.

Inspection

Water Supply:

See that Controlling Valves are properly open.

Air Pressure:

See that proper air pressure is maintained on the system.

Priming Water Level:

1 Open Valve 44 slightly to see that priming water is up to this level, then close Valve 44. If water does not appear, add priming water in the following manner: Close Valve 43, open Valves 41 and 39 and fill Chamber to level of Funnel 40. Close Valves 39 and 41, and open Valve 43; this will automatically reprime the Dry-Pipe Valve. Repeat this process if necessary until water appears at Valve 44 when slightly opened. Leave Priming Chamber 42 filled with water, Valve 41 closed and Valve 43 open, in order that the full capacity of the reservoir will be available to automatically follow up any leakage at Air Seat 5.

2 Open Valve 45 slightly to see if the system of sprinklers and piping is free of water down to the level of Air Inlet 48. If water appears, close Valve 45 and draw off a small quantity of water through Valve 46. Repeat test, closing Valve 45 when air appears.

Drain Valves at Low Points:

As water from condensation may settle at the low points of the system it will be prudent to partially open all Drain Valves occasionally throughout the system and if water appears draw it off, closing the Valves as soon as air appears.

Drip Check:

Observe whether there is any leakage of water through Drip Check Valve 13 into Drip Funnel 16. Press in on plunger of Drip Check Valve 13 to test that its clapper is in open position. If no water appears, Air Seat 5 and Water Seat 3 are tight.

Testing of Alarms—All Insurance Jurisdictions except the Central Actuarial Bureau:

Open Valve 53 and thus allow water pressure from supply pipe, controlled by Valve 52, to enter Circuit Closer 19, or Water Motor 25 if installed, and sound a continuous alarm if in working order. After test has been made Valve 53 should be closed.

Testing of Alarms—Central Actuarial Bureau:

Open Valve 53 and thus allow water pressure from supply pipe, controlled by Valve 52, to enter Circuit Closer 19, or Water Motor 25 if installed, and sound a continuous alarm if in working order. After test has been made Valve 53 should be closed, and Valve 56 opened to drain Alarm Piping. Close Valve 56 after water ceases to flow.

Important

In our opinion dry-pipe systems should not be filled with water during warm weather.

Air Pressure should be maintained on Dry-Pipe Systems throughout the year unless changed by consent of the Inspection Department having Jurisdiction.

All important valves are left sealed in correct positions when installation is first completed and turned over to the owner.

It is recommended that these seals be replaced by owner, after valves are operated, by seals or straps to insure their being left in correct position for the proper operation of the equipment controlled by the Dry-Pipe Valve.

The Grinnell Dry Valve Accelerator, Type "A"

Installed with Grinnell Dry-Pipe Valve, No. 12

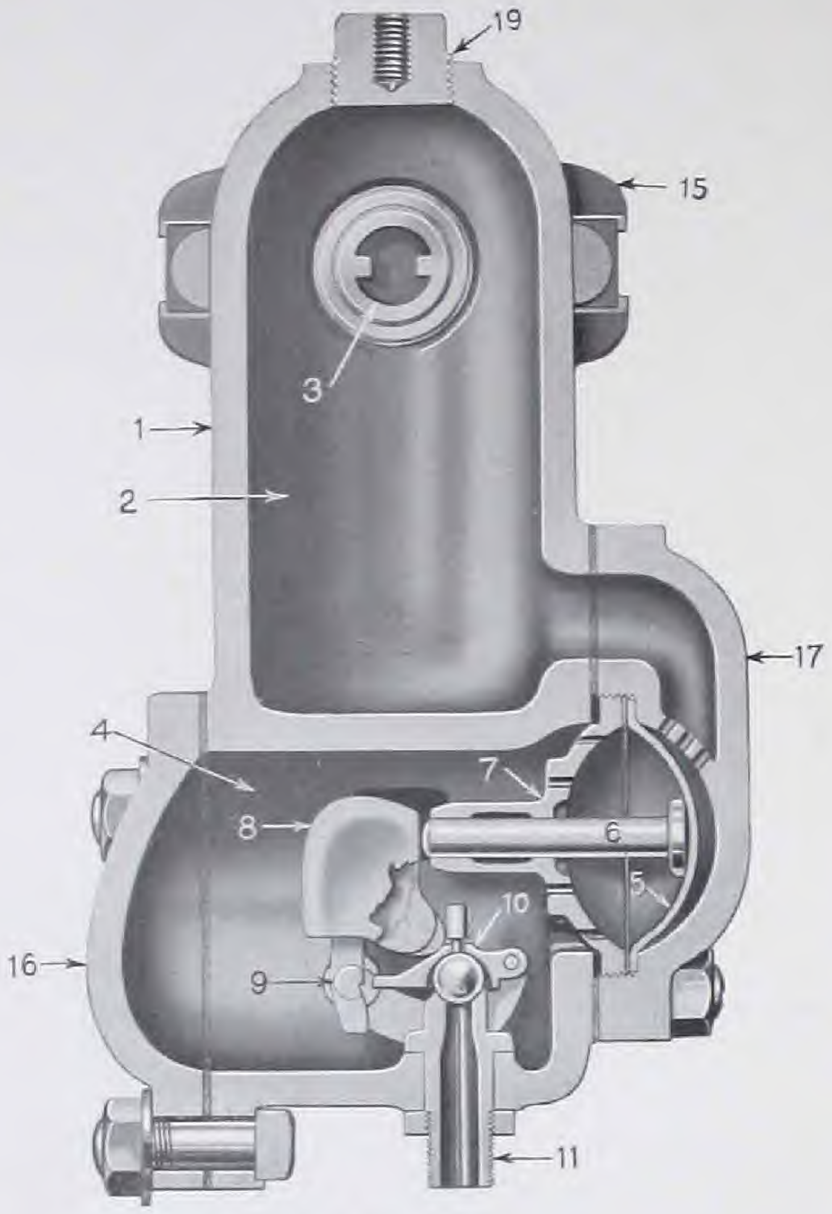


Fig. A

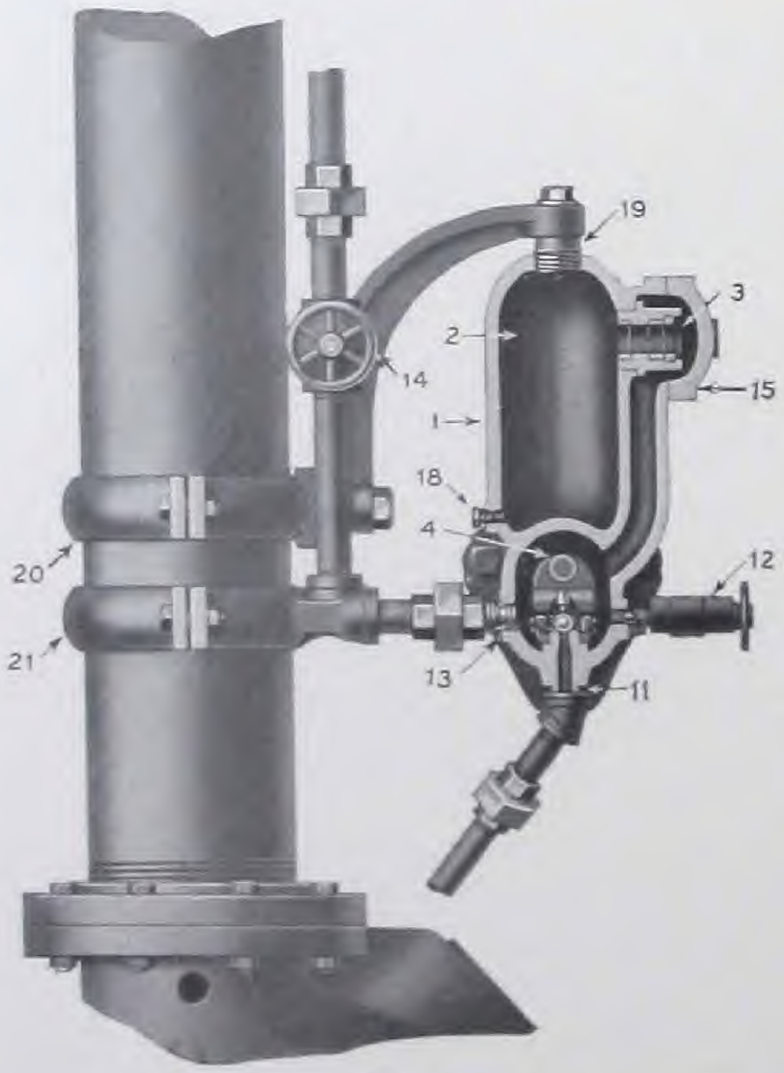
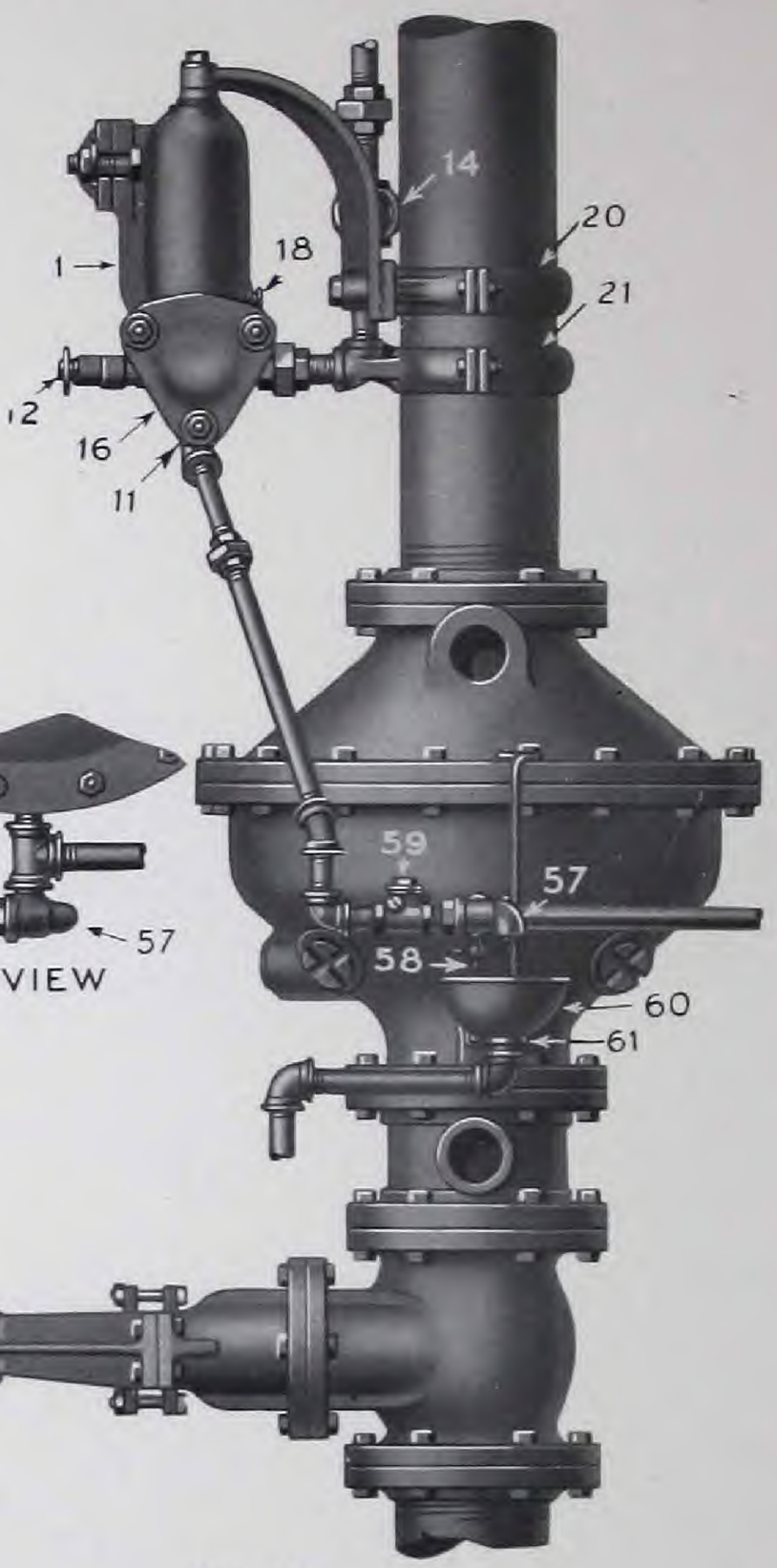


Fig. B



PLAN VIEW

Fig. N

NOTE:—The Accelerator illustrated herewith and described on opposite page is the original model of the Type "A" Accelerator as first installed. Hand-Hole Plate 16 is triangular. On the later Accelerators of this model, a cupped elbow with large square head plug was substituted for Priming Valve and Cup 12.

On the later model of the Type "A" Accelerator as illustrated and described with the Grinnell Dry-Pipe Valve, Model "D" on pages 82 and 83, Hand-Hold Plate 16 is rectangular.

If the later model has been installed, follow instructions for priming the Accelerator as given on page 83, but follow instructions on opposite page for all other details of maintaining the Accelerator and connections.

See page 85 for replacement Accelerators or replacement parts.

The Grinnell Dry Valve Accelerator, Type "A"

Installed with Grinnell Dry-Pipe Valve, No. 12

Instructions for Maintenance

The Grinnell Dry Valve Accelerator attached to the Dry-Pipe Valve should not be removed, disconnected or otherwise disturbed except as directed below.

The Grinnell Dry Valve Accelerator is a device to trip or open the Dry-Pipe Valve quickly upon the opening of a sprinkler.

A slight sudden drop in air pressure will trip or open both the Accelerator and the Dry-Pipe Valve; therefore, greater care is necessary in drawing off or blowing out water of condensation or slow drainage, in testing for water column and in reducing high air pressure. The only safe way to make these tests is as follows:—

1. Close Globe Valve 14 which controls the Accelerator.
2. Remove Plug 18 to release the air pressure in Upper Chamber 2 of the Accelerator.
3. Blow out water at each test, vent or drain valve, or release the excess of air pressure in the system in the usual manner.
4. Replace Plug 18 and then open wide Globe Valve 14 and strap or seal it open.

Directions for Setting Accelerator, etc.

If the Dry-Pipe Valve has opened, close the Main Gate Valve and drain the system in the usual manner, and then close Globe Valve 14, (Fig. B).

Set and prime the Dry-Pipe Valve, pump air into the System, close the Main Draw-off or Test Valve below the Dry-Pipe Valve and partially open the Main Gate Valve in the usual manner. See that both the Air and the Water Seats of the Dry-Pipe Valve are tight, then close the Main Gate Valve.

With the Globe Valve 14 closed, open Hand-Hole Plate 16 (Fig. A) of the Accelerator. Remove Plug 18 (Fig. B) and see that there is no water in Upper Chamber 2. Push Diaphragm Rod 6 (Fig. A) into position as shown, then replace Plug 18.

Partially open Globe Valve 14 and see that there is no water in the ¾-inch connection from the System. Then close Globe Valve 14.

Carefully clean Ball Valve 10 (Fig. A) and its Seat 11, lift Lead Weight 8 to a vertical position, and replace Hand-Hole Plate 16.

NEVER APPLY GREASE, TALLOW OR ANY OTHER OILY SUBSTANCE TO BALL VALVE 10 OR SEAT 11.

With Globe Valve 14 still closed, prime Ball Valve 10 by opening Priming Valve 12 (Fig. B) and slowly pouring water into the Priming Cup attached until no more water will enter the Accelerator. (As there is no vent to the Accelerator, priming water will enter same very slowly. Nearly a pint of water is necessary to properly prime Ball Valve 10.) Tightly close Priming Valve 12 and open Globe Valve 14.

See that Ball Valve 10 is tight, otherwise the water or air will come out at Ball Drip Valve 57 (Fig. N). If Ball Valve 10 is not tight, close Globe Valve 14 and again clean Valve 10, etc. If Ball Valve 10 is tight, open wide the Main Gate Valve under the Dry-Pipe Valve placing the Accelerator and the Dry-Pipe System in service.

The Pet Cock 58 attached to the Accelerator Ball Drip Valve 57 should be left slightly open to take care of the leakage past the water seat of the Dry-Pipe Valve. This will prevent the water from running out at the Ball Drip and tend to keep clean both the Ball and its Seat.

Note:—Before Leaving the Accelerator

1. Be sure that Plug 18 is screwed into place.
2. Be sure that no water or air appears at Ball Drip Valve 57.
3. Make sure that Globe Valve 14 is opened wide and sealed or strapped.

Service Notice

Any further information relative to the Accelerator may be obtained from the nearest office of Grinnell Company, Inc. (See page 97.)

In case changes are to be made, such as additional sprinklers, changes in piping, rearrangement of the Dry-Pipe Valve or Accelerator Connections or repairs to the same, we *advise* that the work be done by Grinnell Company, Inc. We can furnish men at short notice who are thoroughly experienced in Accelerator work.

The Grinnell Dry Valve Accelerator, Type "A"

Installed with Grinnell Dry-Pipe Valve, Types "A" and "B"

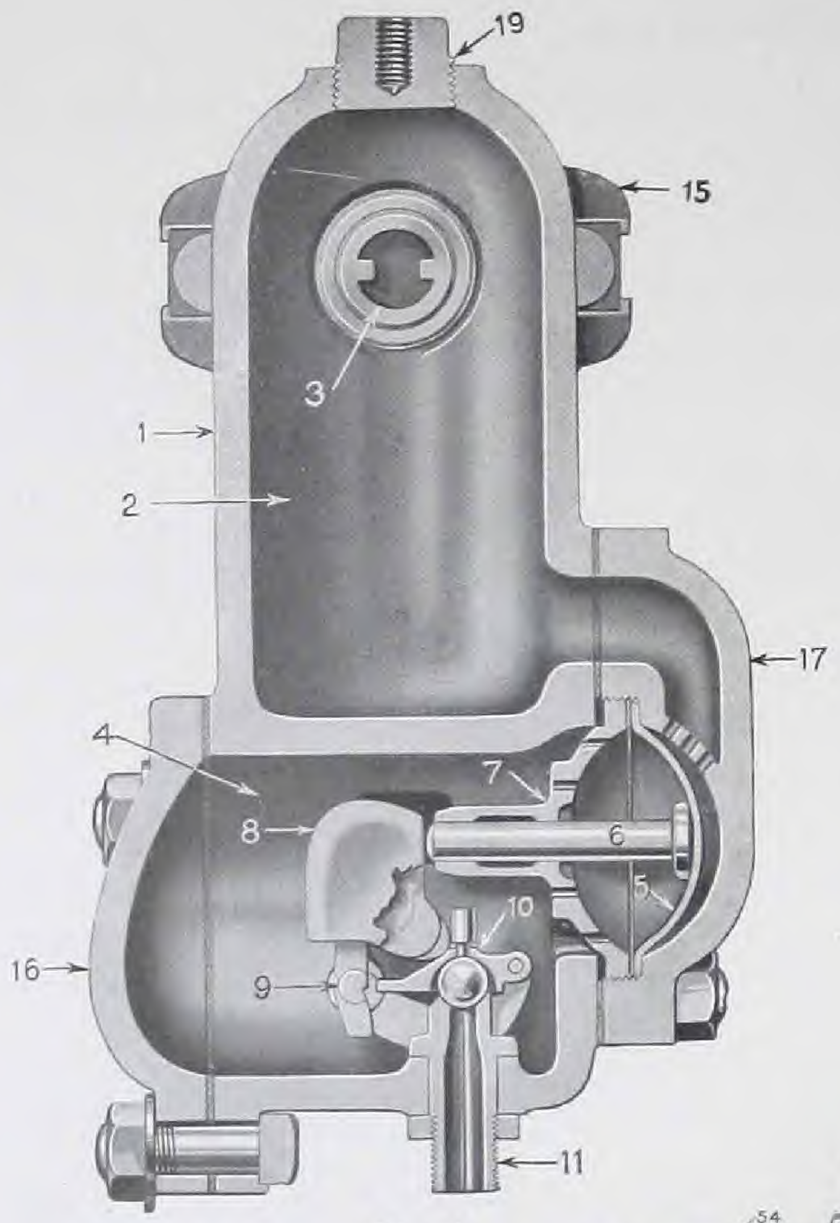


Fig. A

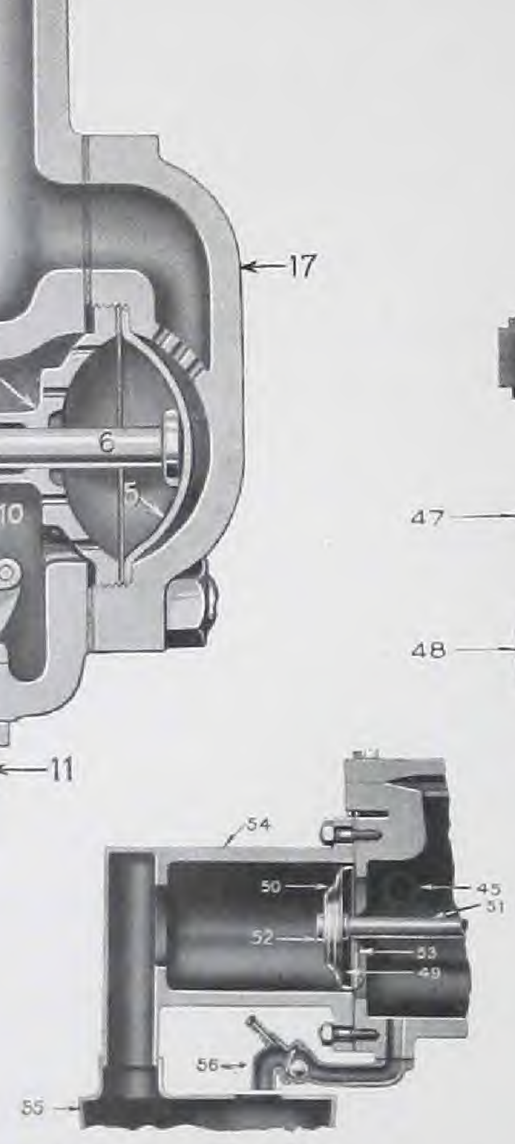


Fig. M

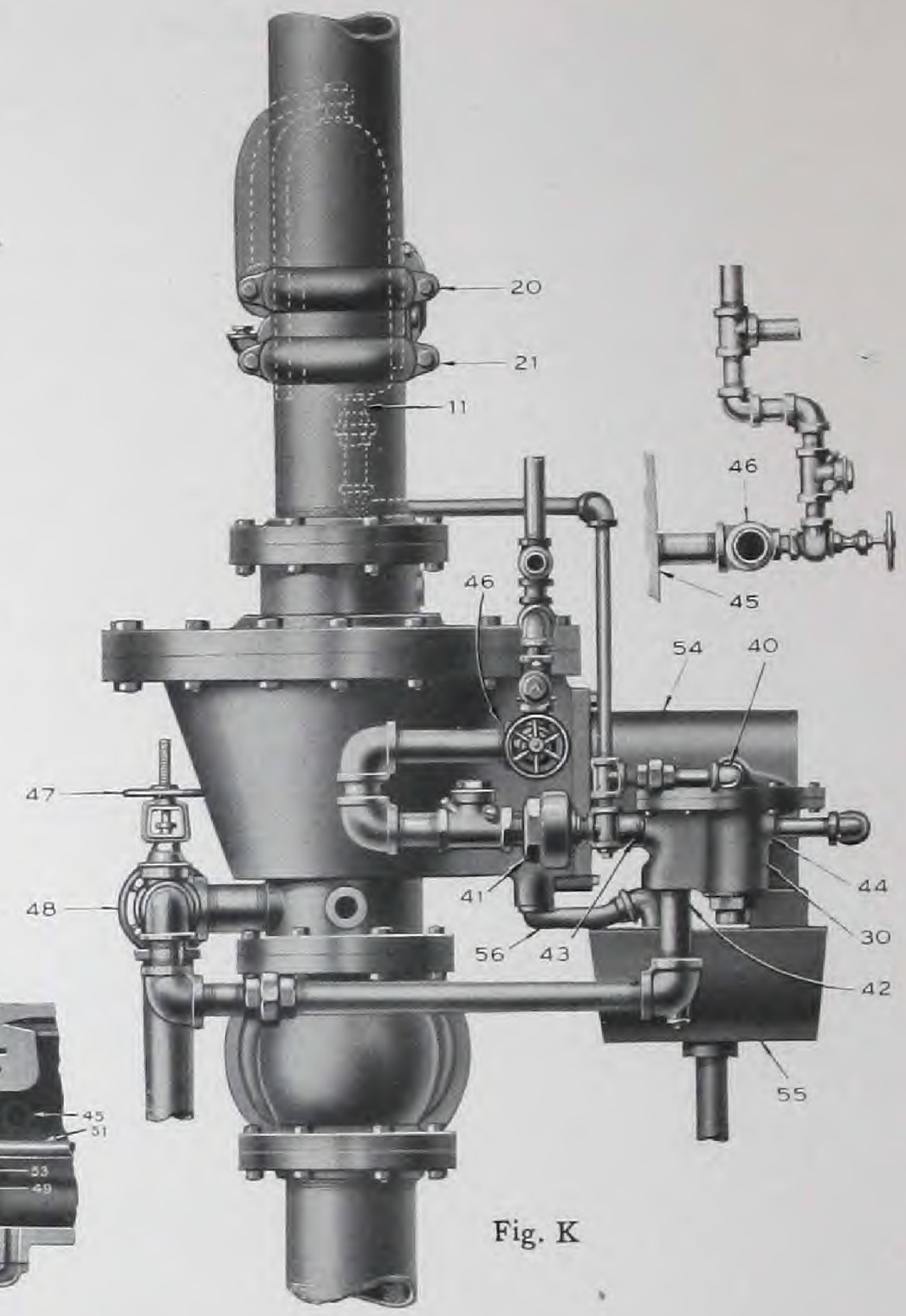


Fig. K

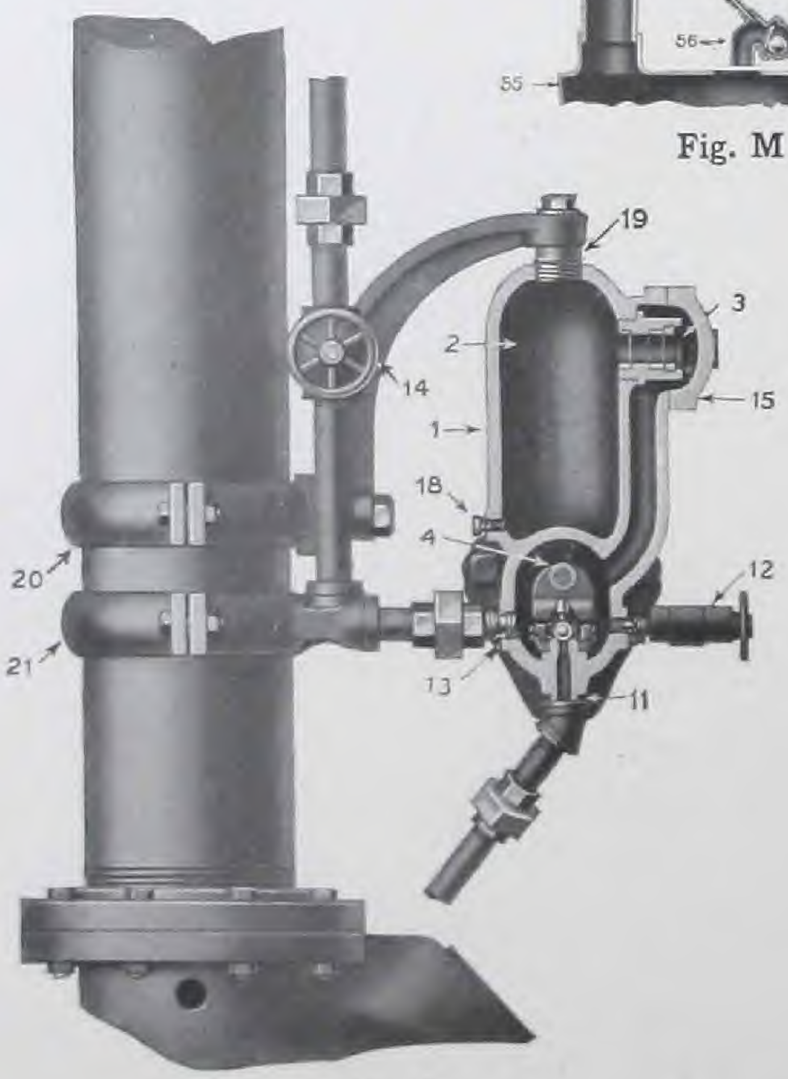


Fig. B

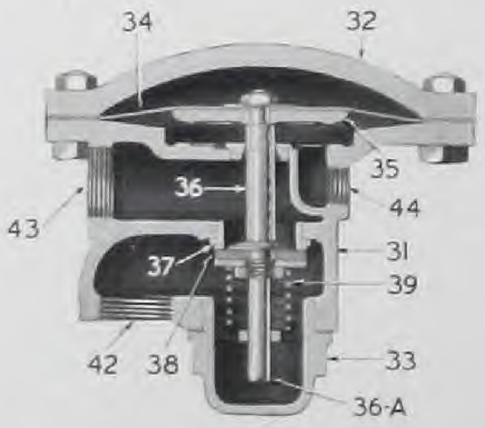


Fig. J

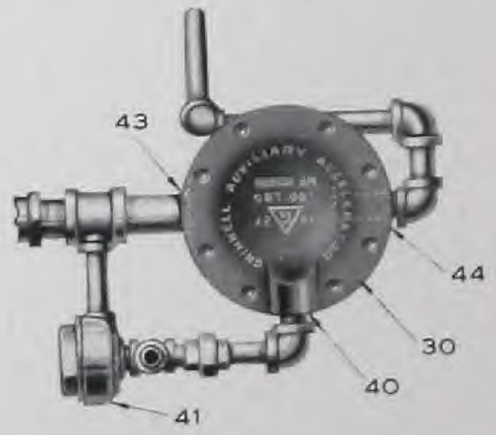


Fig. L

Note:—The Accelerator illustrated herewith and described on opposite page is the original model of the Type "A" Accelerator as first installed. Hand-Hole Plate 16 is triangular. On the later Accelerators of this model, a cupped elbow with large square head plug was substituted for Priming Valve and Cup 12.

On the later model of the Type "A" Accelerator as illustrated and described with the Grinnell Dry-Pipe Valve, Model "D" on pages 82 and 83, Hand-Hole Plate 16 is rectangular.

If the later model has been installed, follow instructions for priming the Accelerator as given on page 83, but follow instructions on opposite page for all other details of maintaining the Accelerator and connections.

See page 85 for replacement Accelerators, Auxiliary Accelerators, or replacement parts.

The Grinnell Dry Valve Accelerator, Type "A"

Installed with Grinnell Dry-Pipe Valve, Types "A" and "B"

Instructions for Maintenance

The Grinnell Dry Valve Accelerator attached to the Dry-Pipe Valve should not be removed, disconnected or otherwise disturbed except as directed below.

The Grinnell Dry Valve Accelerator is a device to trip or open the Dry-Pipe Valve quickly upon the opening of a sprinkler.

A slight sudden drop in air pressure will trip or open both the Accelerator and the Dry-Pipe Valve; therefore, greater care is necessary in drawing off or blowing out water of condensation or slow drainage, in testing for water column and in reducing high air pressure. The only safe way to make these tests is as follows:—

1. Close Globe Valve 14 which controls the Accelerator.
2. Remove Plug 18 to release the air pressure in Upper Chamber 2 of the Accelerator.
3. Blow out water at each test, vent or drain valve, or release the excess of air pressure in the system in the usual manner.
4. Replace Plug 18 and then open wide Globe Valve 14 and strap or seal it open.

Directions for Setting Accelerator, etc.

If the Dry-Pipe Valve has opened, close the Main Gate Valve and drain the System in the usual manner, and then close Globe Valve 14 (Fig. B).

Note:—If the Auxiliary Accelerator 30 (Figs. J, K) has a small Ball Drip Valve attached to Cover 32, see that this Valve is open. If this Valve is closed, press in on the Ball with a nail or wire until the Valve remains open.

Set and prime the Dry-Pipe Valve, pump air into the System, close Main Draw-off and Test Valve 48 below the Dry-Pipe Valve, and partially open the Main Gate Valve below the Dry-Pipe Valve in the usual manner. See that both Air and Water Seats of the Dry-Pipe Valve are tight.

See that 1¼-inch O. S. & Y. Gate Valve 47 (Fig. K) is open and that water is not leaking past Valve Seat 37 (Fig. J) of the Auxiliary Accelerator and entering the Intermediate Chamber of the Dry-Pipe Valve at Water Inlet 45 (Fig. M). If water is found to leak past Seat 37, close the Main Gate Valve, open Main Draw-off and Test Valve 48 and remove Cap 33 from the Auxiliary Accelerator, taking care not to lose Valve Spring 39. It will then be possible to drop Valve Rod 36-A and clean Disc 38 and Seat 37. Replace Cap 33 and Spring 39, close Draw-off and Test Valve 48 and again partially open the Main Gate Valve. If Valve Seat 37 is then tight, shut and bolt the Hand-Hole Plate of the Dry-Pipe Valve and fully open the Main Gate Valve.

Note:—On the first model of the Auxiliary Accelerator, which has an outside diameter of 7¾-inches, it is not possible to clean Water Seat 37 as described in previous paragraph. If trouble develops with this device, we recommend that it be replaced with a new model Auxiliary Accelerator and connections as shown in Figs. K and L.

Close 1¼-inch O. S. & Y. Gate Valve 47, and with Globe Valve 14 closed, open Hand-Hole Plate 16 (Fig. A) of the Accelerator. Remove Plug 18 (Fig. B) and see that there is no water in Upper Chamber 2. Push Diaphragm Rod 6 (Fig. A) into position as shown, then replace Plug 18.

Partially open Globe Valve 14 and see that there is no water in the ¾-inch connection from the System. Then close Globe Valve 14.

Carefully clean Ball Valve 10 (Fig. A) and its Seat 11, lift Lead Weight 8 to a vertical position and replace Hand-Hole Plate 16.

NEVER APPLY GREASE, TALLOW OR ANY OTHER OILY SUBSTANCE TO BALL VALVE 10 OR SEAT 11.

With Globe Valve 14 still closed, prime Ball Valve 10 by opening Priming Valve 12 (Fig. B) and slowly pouring water into the Priming Cup attached until no more water will enter the Accelerator. (As there is no vent to the Accelerator, priming water will enter same very slowly. Nearly a pint of water is necessary to properly prime Ball Valve 10.) Tightly close Priming Valve 12 and open Globe Valve 14.

See that Ball Valve 10 is tight, as follows: Remove ½-inch plug in lower end of tee adjoining Restriction Unit 41 (Fig. K) and see that no water or air comes out, in which case Ball Valve 10 is tight. If Ball Valve 10 is not tight, close Globe Valve 14 and again clean Valve 10, etc. If Ball Valve 10 is tight, replace the ½-inch plug in tee, open wide the Main Gate Valve under the Dry-Pipe Valve placing the Accelerator and the Dry-Pipe System in service.

Note:—On the first two models of the Auxiliary Accelerator, air or water will appear at the Ball Drip Valve attached to Cover 32 when Ball Valve 10 is not tight.

Note:—Before Leaving the Accelerator

1. Be sure that Plug 18 is screwed into place.
2. Be sure that Ball Valve 10 is tight and ½-inch plug is replaced in tee.
3. Make sure that Globe Valve 14 and 1¼-inch O. S. & Y. Gate Valve 47 are opened wide and sealed or strapped.

Service Notice

Any further information relative to the Accelerator may be obtained from the nearest office of Grinnell Company, Inc. (See page 97.)

In case changes are to be made, such as additional sprinklers, changes in piping, rearrangement of the Dry-Pipe Valve or Accelerator Connections or repairs to the same, we *advise* that the work be done by Grinnell Company, Inc. We can furnish men at short notice who are thoroughly experienced in Accelerator work.

The Grinnell Dry Valve Accelerator, Type "A"
Installed with Grinnell Dry-Pipe Valve, Models "C" and "D"

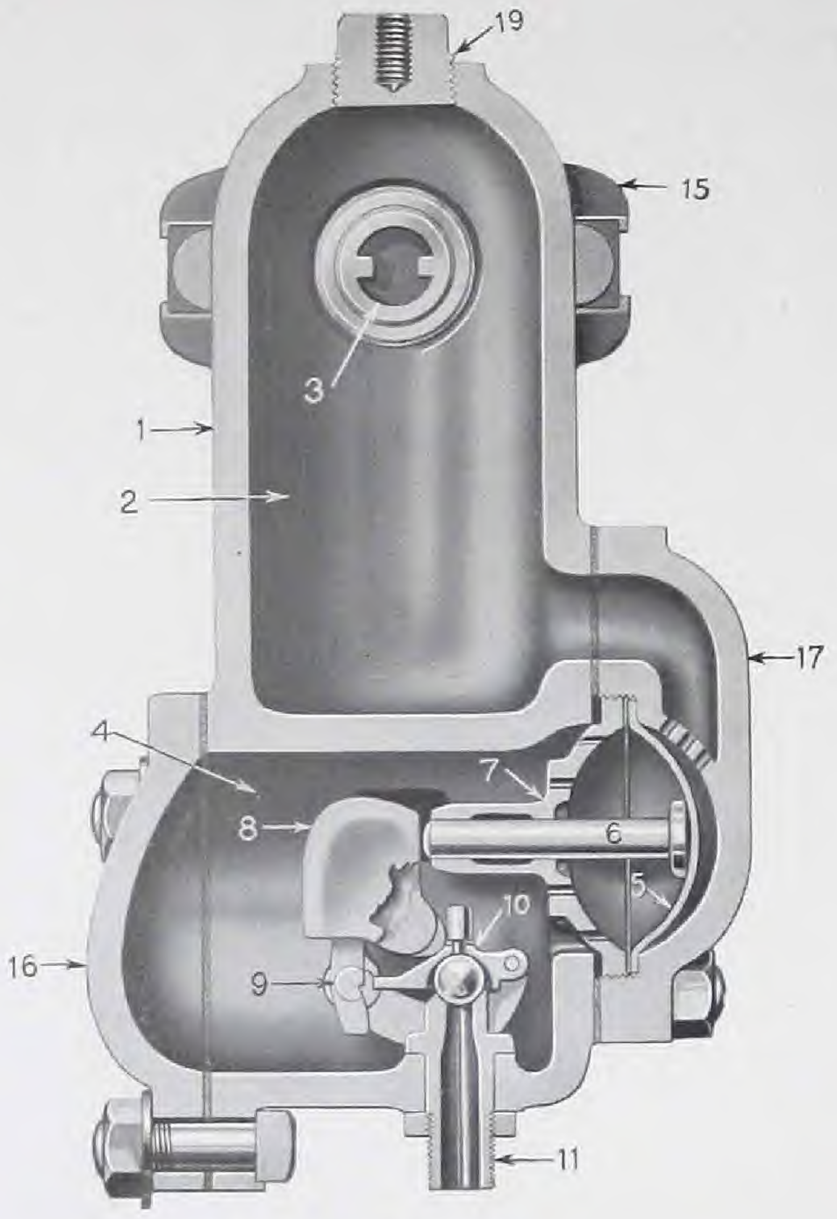


Fig. A

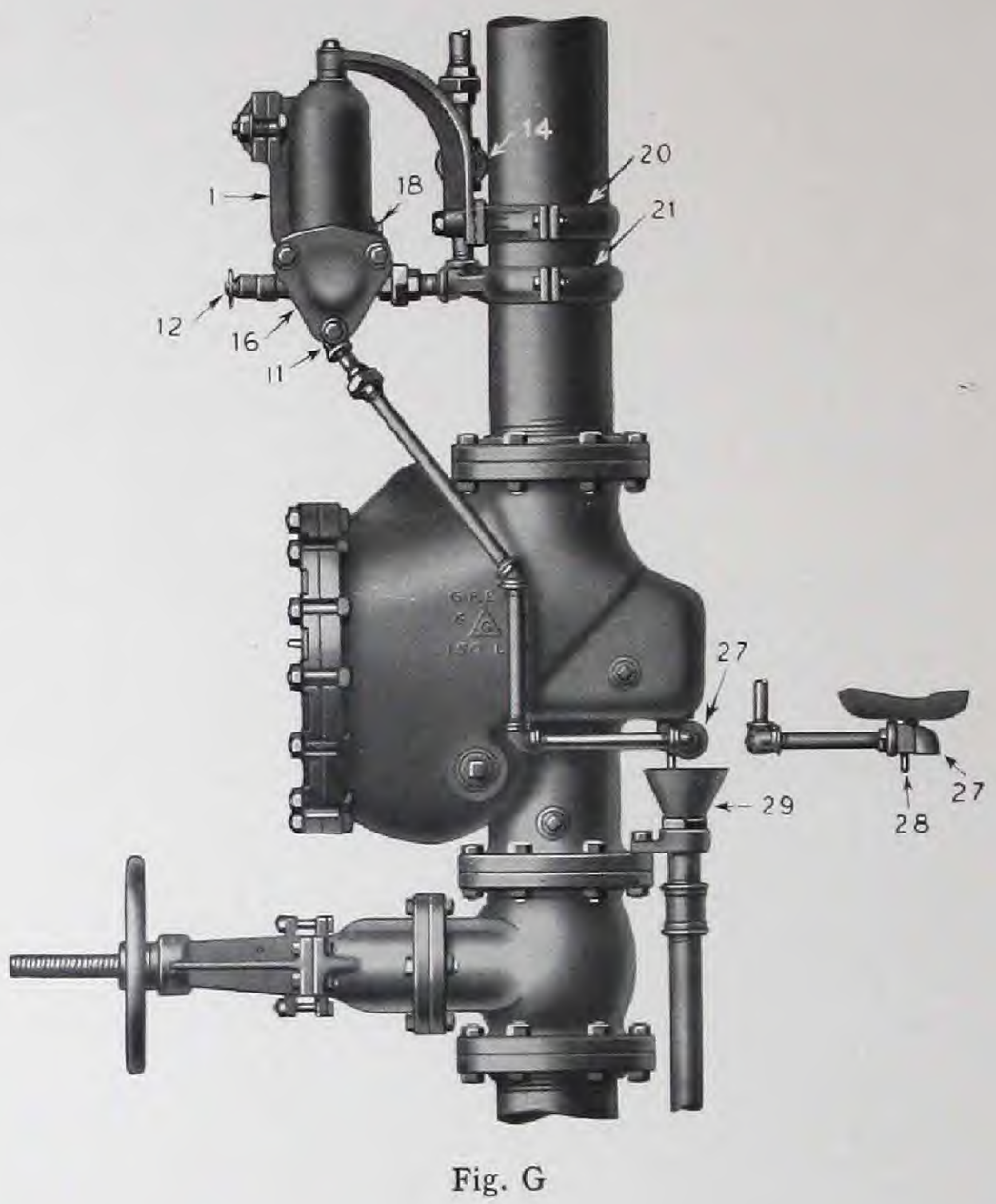


Fig. G

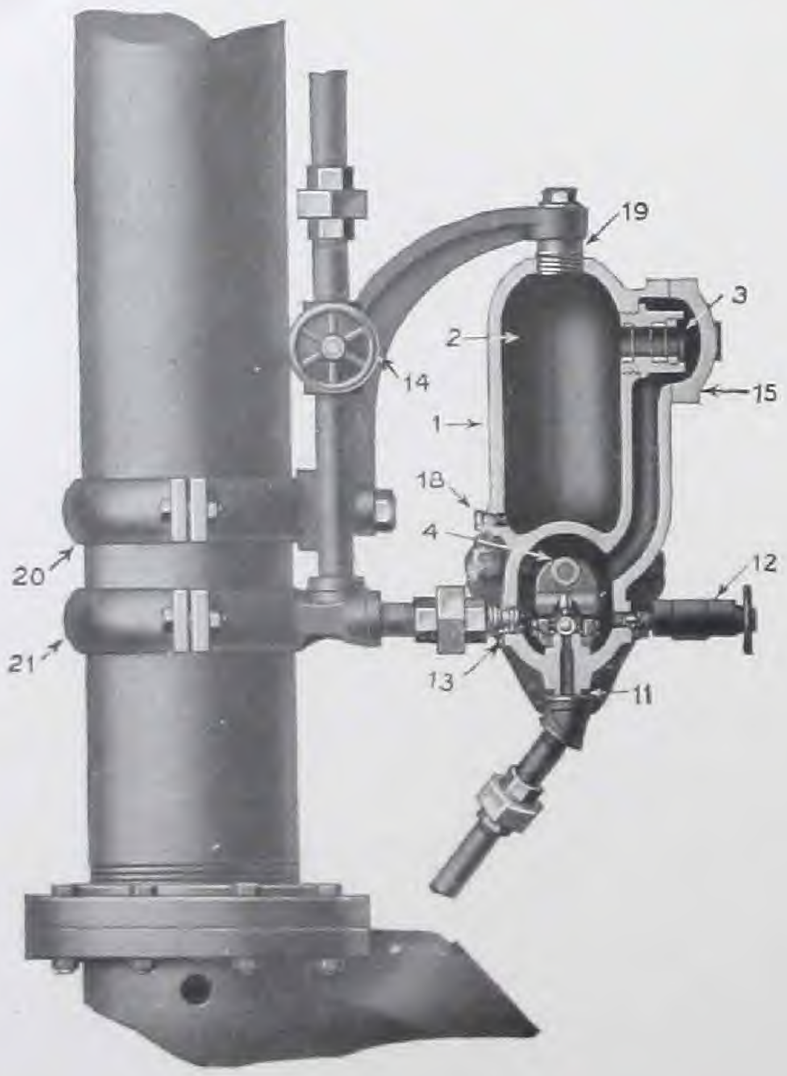


Fig. B

Note:—The Accelerator illustrated herewith and described on opposite page is the original model of the Type "A" Accelerator as first installed. Hand-Hole Plate 16 is triangular. On the later Accelerators of this model, a cupped elbow with large square head plug was substituted for Priming Valve and Cup 12.

On the later model of the Type "A" Accelerator as illustrated and described with the Grinnell Dry-Pipe Valve, Model "E" on pages 82 and 83, Hand-Hole Plate 16 is rectangular.

If the later model has been installed, follow instructions for priming the Accelerator as given on page 83, but follow instructions on opposite page for all other details of maintaining the Accelerator and connections.

See page 85 for replacement Accelerators or replacement parts.

The Grinnell Dry Valve Accelerator, Type "A"

Installed with Grinnell Dry-Pipe Valve, Models "C" and "D"

Instructions for Maintenance

The Grinnell Dry Valve Accelerator attached to the Dry-Pipe Valve should not be removed, disconnected or otherwise disturbed except as directed below.

The Grinnell Dry Valve Accelerator is a device to trip or open the Dry-Pipe Valve quickly upon the opening of a sprinkler.

A slight sudden drop in air pressure will trip or open both the Accelerator and the Dry-Pipe Valve; therefore, greater care is necessary in drawing off or blowing out water of condensation or slow drainage, in testing for water column and in reducing high air pressure. The only safe way to make these tests is as follows:—

1. Close Globe Valve 14 which controls the Accelerator.
2. Remove Plug 18 to release the air pressure in Upper Chamber 2 of the Accelerator.
3. Blow out water at each test, vent or drain valve, or release the excess of air pressure in the system in the usual manner.
4. Replace Plug 18 and then open wide Globe Valve 14 and strap or seal it open.

Directions for Setting Accelerator, etc.

If the Dry-Pipe Valve has opened, close the Main Gate Valve and drain the system in the usual manner, and then close Globe Valve 14, (Fig. B).

Set and prime the Dry-Pipe Valve, pump air into the System, close the Main Draw-off Valve and partially open the Main Gate Valve in the usual manner. See that both the Air and the Water Seats of the Dry-Pipe Valve are tight, then close the Main Gate Valve.

With the Globe Valve 14 closed, open Hand-Hole Plate 16 (Fig. A) of the Accelerator. Remove Plug 18 (Fig. B) and see that there is no water in Upper Chamber 2. Push Diaphragm Rod 6 (Fig. A) into position as shown, then replace Plug 18.

Partially open Globe Valve 14 and see that there is no water in the ¾-inch connection from the System. Then close Globe Valve 14.

Carefully clean Ball Valve 10 (Fig. A) and its Seat 11, lift Lead Weight 8 to a vertical position, and replace Hand-Hole Plate 16.

NEVER APPLY GREASE, TALLOW OR ANY OTHER OILY SUBSTANCE TO BALL VALVE 10 OR SEAT 11.

With Globe Valve 14 still closed, prime Ball Valve 10 by opening Priming Valve 12 (Fig. B) and slowly pouring water into the Priming Cup attached until no more water will enter the Accelerator. (As there is no vent to the Accelerator, priming water will enter same very slowly. Nearly a pint of water is necessary to properly prime Ball Valve 10.) Tightly close Priming Valve 12 and open Globe Valve 14.

See that Ball Valve 10 is tight, otherwise the water or air will come out at Ball Drip Valve 27 (Fig. G). If Ball Valve 10 is not tight, close Globe Valve 14 and again clean Valve 10, etc. If Ball Valve 10 is tight, open wide the Main Gate Valve under the Dry-Pipe Valve placing the Accelerator and the Dry-Pipe System in service.

Note:—Before Leaving the Accelerator

1. Be sure that Plug 18 is screwed into place.
2. Be sure that no water or air appears at Ball Drip Valve 27.
3. Make sure that Globe Valve 14 is opened wide and sealed or strapped.

Service Notice

Any further information relative to the Accelerator may be obtained from the nearest office of Grinnell Company, Inc. (See page 97.)

In case changes are to be made, such as additional sprinklers, changes in piping, rearrangement of the Dry-Pipe Valve or Accelerator Connections or repairs to the same, we *advise* that the work be done by Grinnell Company, Inc. We can furnish men at short notice who are thoroughly experienced in Accelerator work.

The Grinnell Dry Valve Accelerator, Type "A"

Installed with Grinnell Dry-Pipe Valve, Model "E"

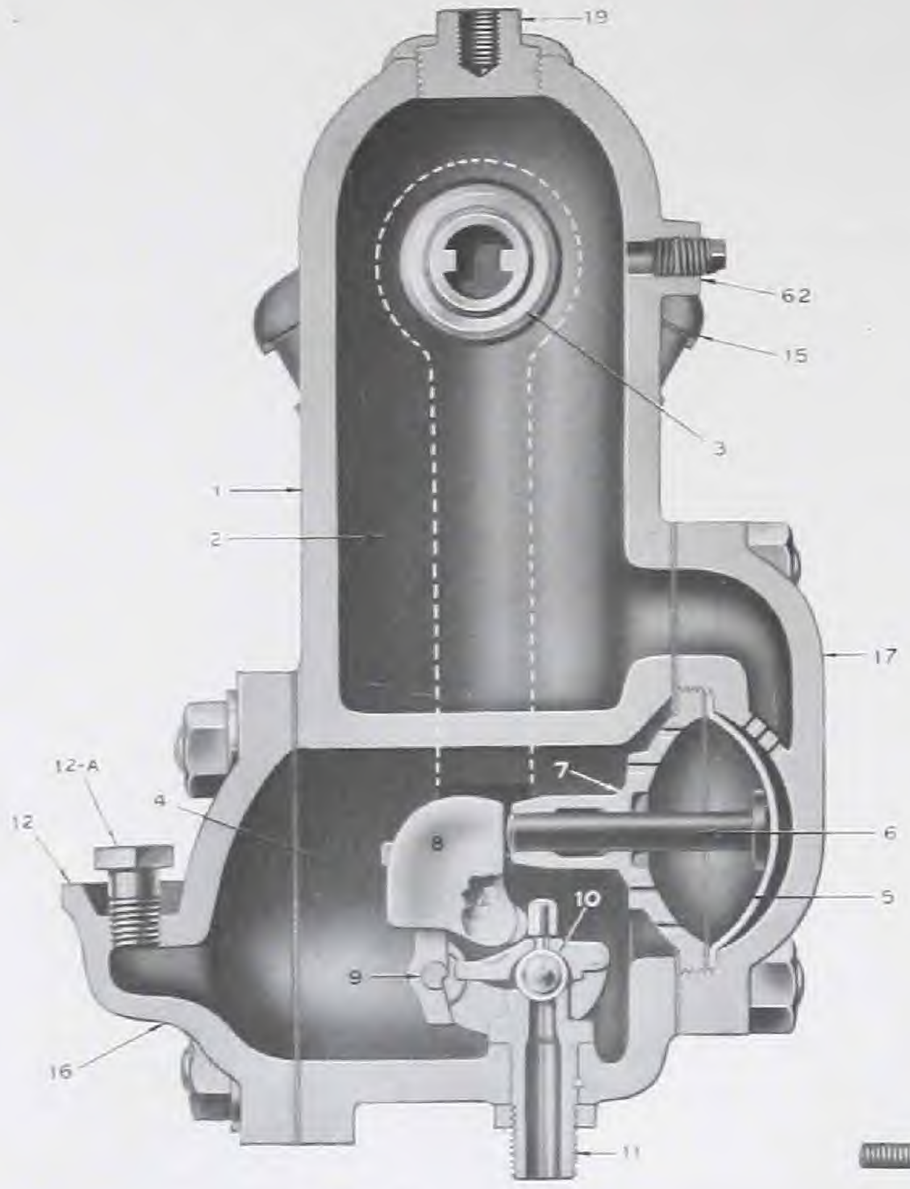


Fig. A

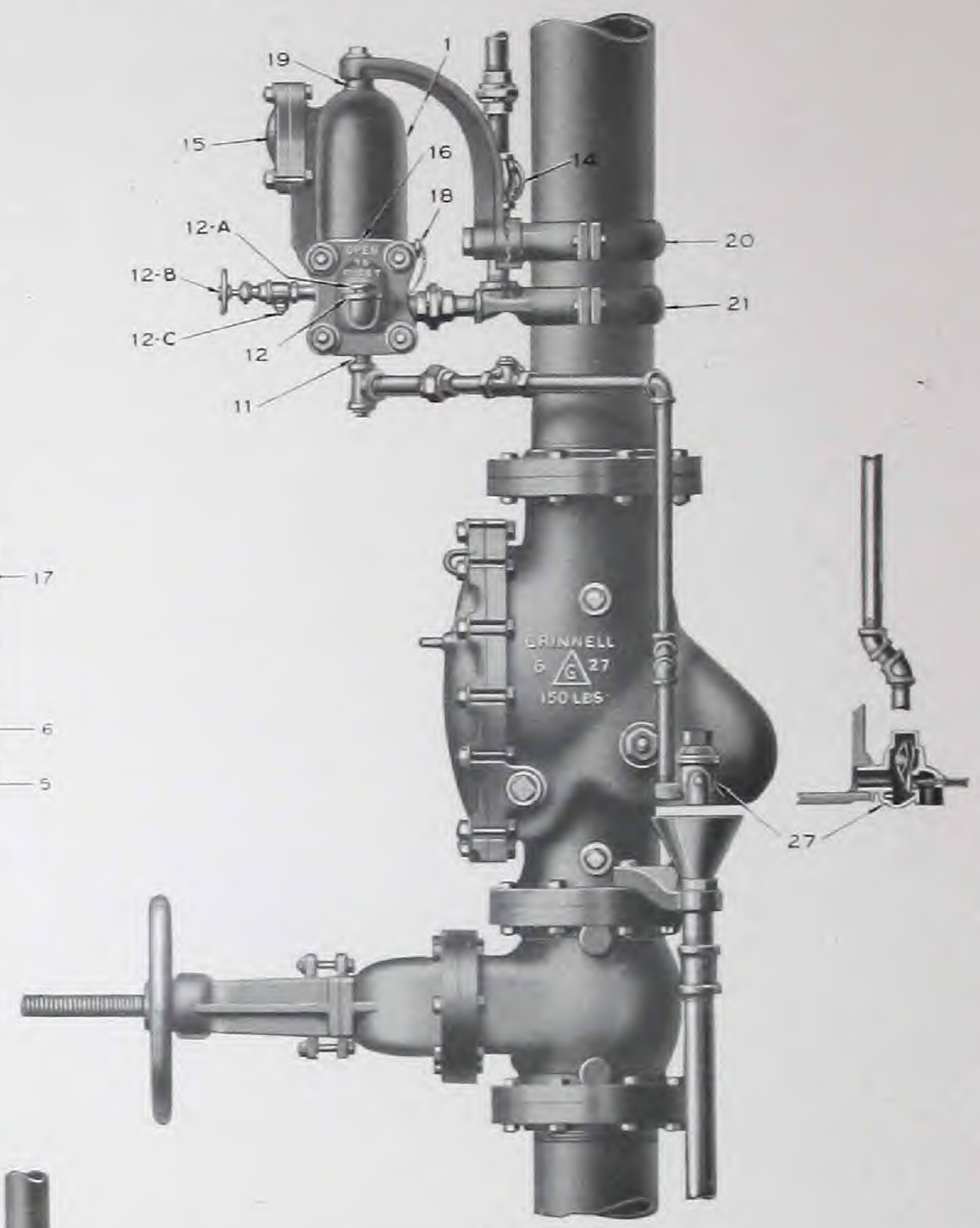


Fig. O

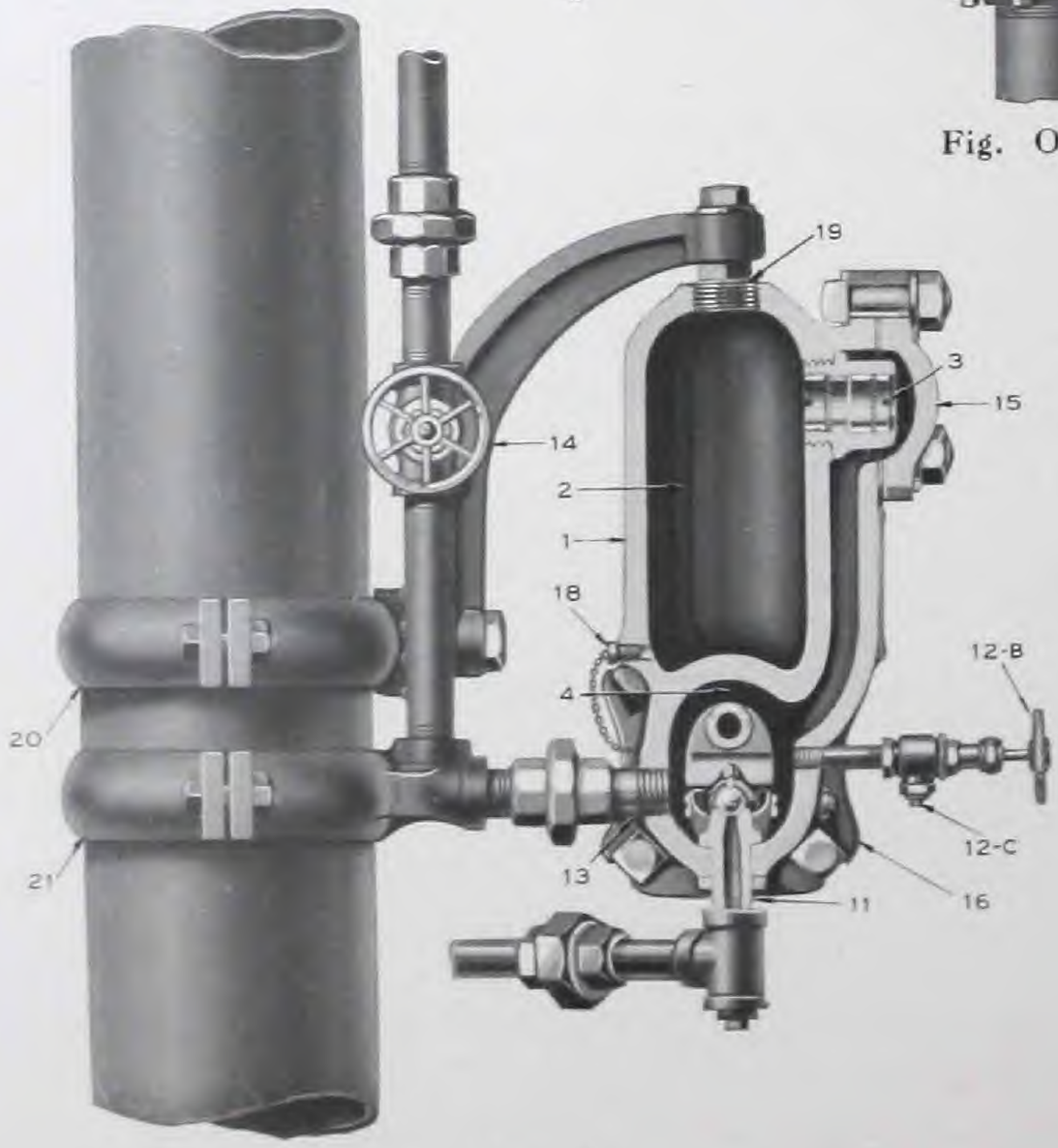


Fig. B

See page 85 for replacement Accelerators or replacement parts

The Grinnell Dry Valve Accelerator, Type "A"

Installed with Grinnell Dry-Pipe Valve, Model "E"

Instructions for Maintenance

The Grinnell Dry Valve Accelerator attached to the Dry-Pipe Valve should not be removed, disconnected or otherwise disturbed except as directed below.

The Grinnell Dry Valve Accelerator is a device to trip or open the Dry-Pipe Valve quickly upon the opening of a sprinkler.

A slight sudden drop in air pressure will trip or open both the Accelerator and the Dry-Pipe Valve; therefore, greater care is necessary in drawing off or blowing out water of condensation or slow drainage, in testing for water column and in reducing high air pressure. The only safe way to make these tests is as follows:—

1. Close Globe Valve 14 which controls the Accelerator.
2. Remove Plug 18 to release the air pressure in Upper Chamber 2 of the Accelerator.
3. Blow out water at each test, vent or drain valve, or release the excess of air pressure in the system in the usual manner.
4. Replace Plug 18 and then open wide Globe Valve 14 and strap or seal it open.

Directions for Setting Accelerator, etc.

If the Dry-Pipe Valve has opened, close the Main Gate Valve and drain the system in the usual manner, and then close Globe Valve 14, (Fig. B).

Set and prime the Dry-Pipe Valve, pump air into the System, close the Main Draw-off Valve and partially open the Main Gate Valve in the usual manner. See that both the Air and the Water Seats of the Dry-Pipe Valve are tight, then close the Main Gate Valve.

With the Globe Valve 14 closed, open Hand-Hole Plate 16 (Fig. A) of the Accelerator. Remove Plug 18 (Fig. B) and see that there is no water in Upper Chamber 2. Push Diaphragm Rod 6 (Fig. A) into position as shown, then replace Plug 18.

Partially open Globe Valve 14 and see that there is no water in the ¾-inch connection from the System. Then close Globe Valve 14.

Carefully clean Ball Valve 10 (Fig. A) and its Seat 11, lift Lead Weight 8 to a vertical position, and replace Hand-Hole Plate 16.

NEVER APPLY GREASE, TALLOW OR ANY OTHER OILY SUBSTANCE TO BALL VALVE 10 OR SEAT 11.

With Globe Valve 14 still closed, remove Plug 12-C (Fig. B). Open Priming Vent Valve 12-B (Fig. B) and remove Priming Plug 12-A (Fig. A). Prime Ball Valve 10 by slowly pouring water into the Priming Cup 12 until water appears at Priming Vent Valve 12-B. (Nearly a pint of water is necessary to properly prime Ball Valve 10). Tightly close Priming Vent Valve 12-B, insert Plug 12-C, Screw Priming Plug 12-A firmly into Priming Cup 12 and then open Globe Valve 14.

See that Ball Valve 10 is tight, otherwise the water or air will come out at Drip Check Valve 27 (Fig. O). If Ball Valve 10 is not tight, close Globe Valve 14 and again clean Valve 10, etc. If Ball Valve 10 is tight, open wide the Main Gate Valve under the Dry-Pipe Valve placing the Accelerator and the Dry-Pipe System in service.

Note:—Before Leaving the Accelerator

1. Be sure that Plug 18 is screwed into place.
2. Be sure that no water or air appears at Drip Check Valve 27.
3. Make sure that Globe Valve 14 is opened wide and sealed or strapped.

Service Notice

Any further information relative to the Accelerator may be obtained from the nearest office of Grinnell Company, Inc. (See page 97.)

In case changes are to be made, such as additional sprinklers, changes in piping, rearrangement of the Dry-Pipe Valve or Accelerator Connections or repairs to the same, we *advise* that the work be done by Grinnell Company, Inc. We can furnish men at short notice who are thoroughly experienced in Accelerator work.

Repairs and Replacement Parts—Grinnell Dry-Pipe Valves, Accelerators, Alarms, etc.

Dry-Pipe Valves cannot be satisfactorily repaired in the field. Some parts of the various types can be replaced as noted in following paragraphs, but if anything is seriously wrong the Dry-Pipe Valve should be replaced with a new Model "E" Dry-Pipe Valve and trimmings; or if it is a Model "C", "D" or "E" Dry-Pipe Valve it should either be replaced with a Model "E" Dry-Pipe Valve or be sent in for repairs to one of our main manufacturing plants, Providence, R. I., or Warren,Ohio. (In case the Model "C", "D"or "E" Dry-Pipe Valve sent in for repairs is in such condition that it would not pay to repair it, the old Valve should be replaced with a new Model "E" Valve.)

A liberal allowance will be made for old Grinnell Dry-Pipe Valves when replaced by Grinnell Model "E" Dry-Pipe Valves upon the return of the old Dry-Pipe Valves (charges prepaid) to one of the plants mentioned above. The amount of the allowance will vary in accordance with the number of years of service of the Valve.

Dry-Pipe Valve, No. 12 (Pages 48 and 49)

This type of Dry-Pipe Valve is no longer manufactured and is considered as obsolete. We can no longer furnish replacement Valves of this type or make any repairs on these Valves either in the shop or in the field. We can furnish no replacement parts of this Valve with the exception of the Rubber Diaphragm B. (Specify Size of Valve when ordering.)

Dry-Pipe Valve, No. 13 (Pages 52 and 53)

This type of Dry-Pipe Valve is no longer manufactured. We cannot furnish replacement Valves of this type, make repairs, or furnish repair parts of the Valve with the exception of the Rubber Diaphragm 2.

Dry-Pipe Valve, Types "A" and "B" (Pages 54 to 58)

These types of Dry-Pipe Valves are no longer manufactured and are considered as obsolete. We can no longer furnish replacement Valves of these types or make any repairs on these Valves either in the shop or in the field. We can furnish no replacement parts of these Valves except as listed below:

Drip Receiver 14, for Types "A" or "B"
Ball Check Valve 15, for Types "A" or "B"
Cylinder 10, for Type "B" only.
} Specify Type and Size of Valve when ordering.

Dry-Pipe Valve, Model "C" (Pages 59 to 63)

The manufacture of this type of Dry-Pipe Valve has been discontinued, and we can no longer furnish replacement Valves of this model. We will, however, make repairs on these Valves if they are sent either to our Providence or to our Warren Plant, provided they can be satisfactorily repaired. We also will make such repairs as can be made in the field, but the only replacement parts which we will furnish for repairs to be made by our men outside the plants mentioned, or by the owners, are as follows:

Rubber Diaphragm 6
Hand-Hole Cover 2
} Specify Size of Valve when ordering.

Dry-Pipe Valve, Model "D" (Pages 64 to 69)

We can no longer furnish replacement Valves of this model in the 6-inch size. We will, however, make repairs on these Valves if they are sent either to our Providence or to our Warren

Repairs and Replacement Parts—Grinnell Dry-Pipe Valves, Accelerators, Alarms, etc. (Continued)

Plant, provided they can be satisfactorily repaired. We will also make such repairs as can be made in the field, but the only replacement parts which we will furnish for repairs to be made by our men outside the plants mentioned, or by the owners, are as follows:

Rubber Diaphragm 6 } Specify Size of Valve
Hand-Hole Cover 2 } when ordering

We can furnish replacement Valves of this model in the 3-inch size in accordance with the terms specified for the Model "E" Valve, as well as make such repairs and furnish replacement parts as specified for the 6-inch size of the Model "D" Valve.

Dry-Pipe Valve, Model "E" (Pages 70 to 75) (Made in 6-inch size only.)

When Model "E" Dry-Pipe Valves are in need of repairs, other than such repairs as can be made in the field, we will make repairs on these Valves if they are sent in to our Providence, R. I., or to our Warren, Ohio, plant, provided they can be satisfactorily repaired, and we will then return the Valve to the customer.

When Model "E" Dry-Pipe Valves are in need of repairs and customer so orders and furnishes us with the Serial Number of the Valve to be repaired, we will furnish a new Valve on an "Exchange" or "Replacement" basis as follows: A Replacement Valve (without trimmings) will be shipped to the customer who, upon receipt of this Valve, will install it in the system in place of the one needing repairs and ship the damaged Valve to our Providence or Warren Plant where it will be repaired if not too badly damaged. The customer will retain the Valve which is shipped to him, and our plant will retain the Valve which the customer has returned. The charge to the customer will be the expense of putting into proper working order the Valve which he has returned to Providence or Warren, plus all transportation charges on both valves.

In case the Valve returned to our plant is in such condition that it would not pay to repair it, a report to this effect will be made to the customer together with a request for authority to scrap the defective Valve; it being understood that the expense to the customer, in addition to the transportation charges on the two Valves, will be the regular sales price of a new Valve (without trimmings) less credit or allowance for the old Valve as mentioned in second paragraph on preceding page.

We will also make such repairs as can be made in the field, but the only replacement parts which we will furnish for repairs to be made by our men outside our plant mentioned above, or by the owners, are as follows:

Rubber Diaphragm 6
Hand-Hole Cover 2 with Latch 11

Dry Valve Accelerator, Type "A" (Pages 76 to 83)

Auxiliary Dry Valve Accelerator (Pages 78 and 79)

On account of the nature of the Accelerator, we strongly urge that all repairs to Grinnell Dry Valve Accelerators, Auxiliary Accelerators, and connections, together with all installation work on Accelerators be performed by one of our men who has been especially trained to take care of repairing and testing Accelerators. A request to our nearest office will receive prompt attention.

NOTE:—Where the old style Priming Cup and Valve 12 was installed as shown on pages 76, 78 and 80, and is giving trouble, we can furnish a Special Cupped Elbow and Plug to replace the Cup and Valve.

(Continued)

Repairs and Replacement Parts—Grinnell Dry-Pipe Valves, Accelerators, Alarms, etc. (Continued)

Water Motor Alarm, Old Style (Pages 54, 61 and 65)

The manufacture of this style has been discontinued. We can furnish, however, the following parts:

Complete Striker Unit, including Slotted Striker 26, Striker Arm and Rod 28. Slotted Strikers, Arms for use with them and Rods can be furnished as separate items to replace others of the same style.

Cast Iron Hood 31, complete with Base Plate.

NOTE:—Should repairs to the old Water Motor 25 be necessary, we recommend that it be replaced by a complete Model "A" Water Motor, Gong and Hood. A credit will be allowed on old Water Motors which are returned to one of our plants (charges prepaid) after being replaced.

Water Motor Alarm, Model "A" (Page 71)

We can furnish the Water Motor Alarm, Model "A" complete with gong and hood, or such replacement parts as are listed below:

Water Motor 25, complete
Striker Shaft or Rod 28
Striker Shaft Bearing 29 complete with Oilless Bearing and Bearing Unit
Striker Arm with Striker 26 and Counterweight complete
Gong 24
Cast Iron Hood 31 complete with Base Plate

Circuit Closer (Pages 48, 52, 54, 60, 64 and 70)

We can furnish the Circuit Closer complete, or such replacement parts as are listed below:

Top Cover
Bronze Diaphragm
Rubber Gasket between Diaphragm and Base
Moulded Bakelite Plunger

NOTE:—While parts listed above will be furnished on order, we recommend that the Circuit Closer either be replaced with a new one, or that the old one be returned to our Providence Plant for repairs. If repairs are impractical, an allowance will be made in the price of a new one. If a new Circuit Closer is ordered for replacement, a credit which will be allowed on return of the old Circuit Closer to one of our plants (charges prepaid).

The above information also applies to Circuit Openers which are the same in general appearance as the Circuit Closers, but are for use on closed circuits.

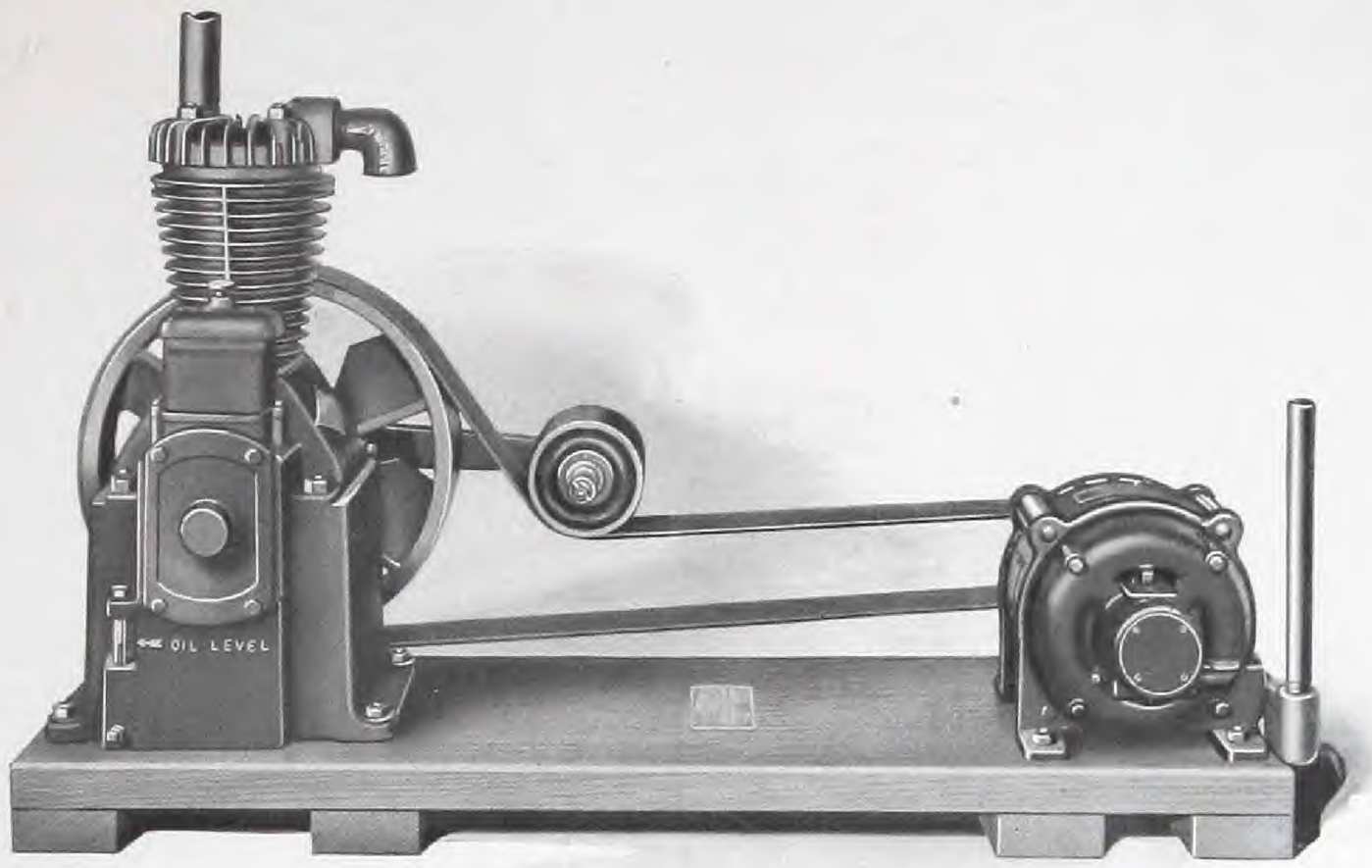
Electric Alarm Bells (not illustrated) can be furnished complete.

Trimmings, Accessories, etc.

We can furnish for replacement use the exterior trimmings illustrated with each of the various types of Dry-Pipe Valves, such as Gauges, small Valves, Priming Funnels and Chambers, Drain Cups, Drip Funnels, Supports, etc., not otherwise excepted in foregoing paragraphs; with the following exception:

Three-Way Test Cock 51 illustrated in Figure "D" of the Type "B" Dry-Pipe Valve on page 58 is no longer manufactured as it is not now approved by any Insurance Interests. By-Pass Test Connection as shown in Fig. F, page 58, should be installed in place of 3-Way Test Cock.

Worthington Vertical Feather Valve Air Cooled Air Compressor



The Compressor should be in a clean light place, free from dust or dirt, and should take in pure cold dry air, as humid air will condense in the cold pipes of the sprinkler system.

Lubrication

A good grade of air compressor cylinder oil or any good grade of light automobile engine oil is suitable for the lubrication of the Compressor. The oil must be poured into the crank case through opening on the side of Compressor until it is shown about half way on the glass of the oil gauge. There is a mark cast on the crank case showing the proper level of oil. The approximate amount of oil to be used in filling the crank case is as follows:

Size 2½ x 3—½ gallon. Size 3½ x 4—1½ gallons.

These Compressors are equipped with oil pump forcing oil under pressure through main bearings and connecting rod bearing thus assuring constant supply of oil to all main parts of the Compressor regardless of the oil level in the crank case. The oil reservoir is of ample size and no damage will occur if the oil level is temporarily neglected. However, do not let the oil level in the crank case get below the point where it cannot be seen on the oil gauge. The lubrication of the Compressor is very important and should not be neglected.

The crank case should be drained, cleaned and filled with fresh oil at required intervals. The frequency with which this is necessary will be determined by the cleanliness of the surroundings and the amount which the Compressor is used. Never use kerosene or gasoline for cleaning of Air Compressor. Its use is dangerous and may result in explosion or other serious damage.

Maintenance

For further information on this Compressor, see Instruction Book furnished with the Compressor.

When ordering Replacement Parts for the Compressor, refer to the Figure Numbers given in the Instruction Book supplied with the Compressor. If Replacement Motors are installed, see that the new motor has the same rated speed as the old one and that the pulley size is the same.

The G. F. E. Duplex Air Compressor

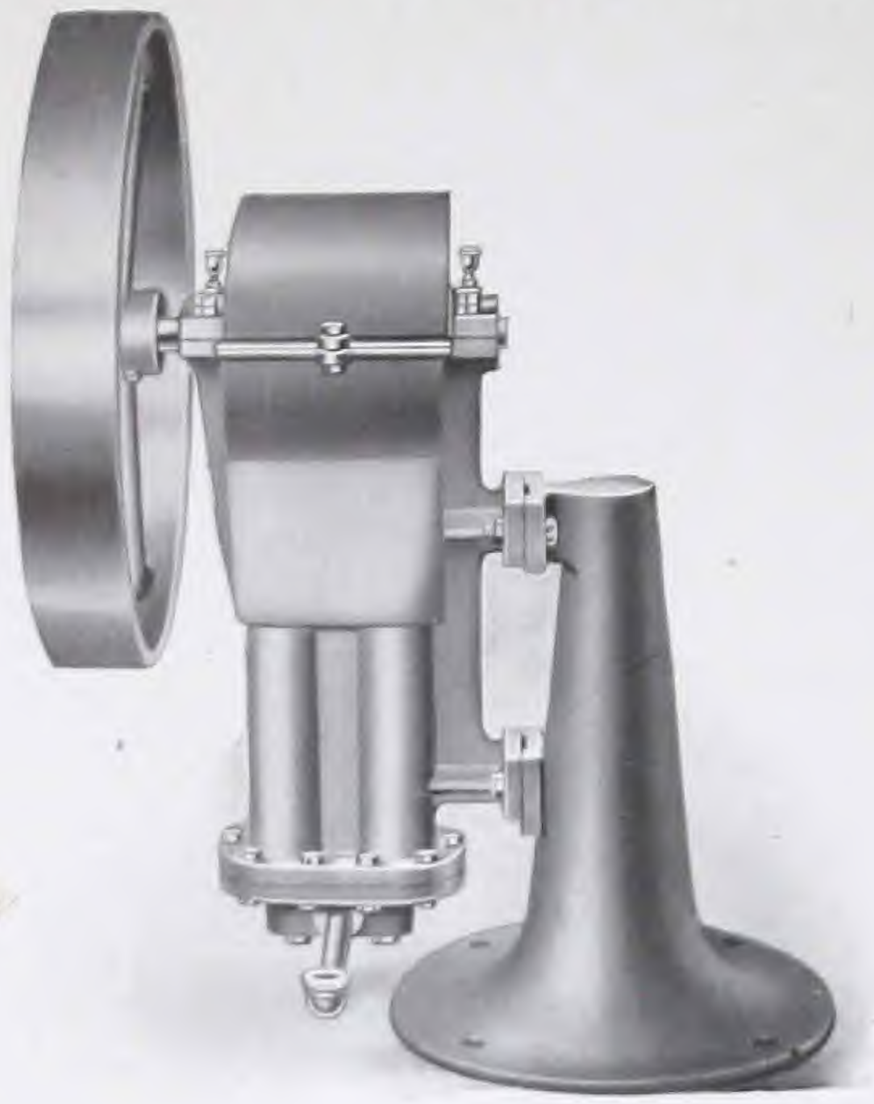


Fig. 1

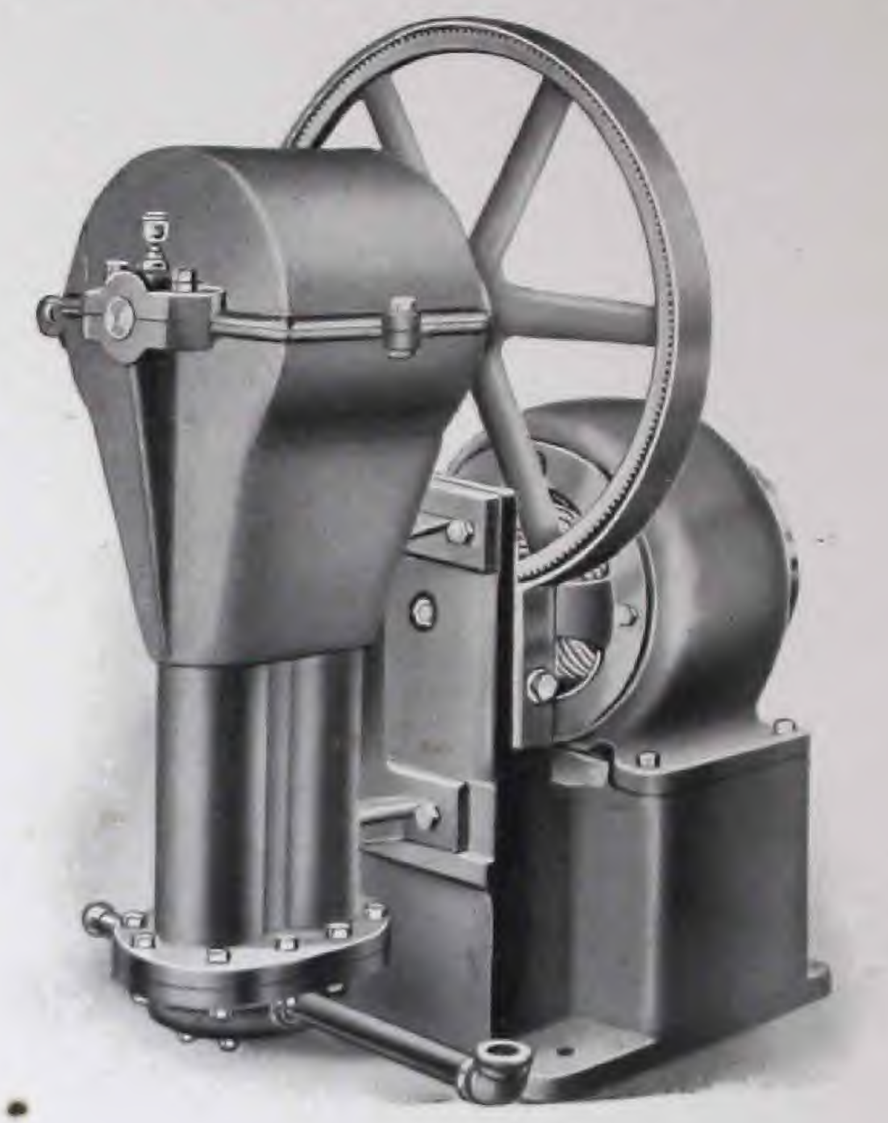


Fig. 2

Fig. 3

Fig. 5

Fig. 4.

The G. F. E. Duplex Air Compressor, also the G. F. E. Single Cylinder Air Compressor of similar design, are no longer manufactured, but repair parts are still obtainable.

When ordering repair parts of the G. F. E. Duplex Air Compressor for replacement be sure to indicate Page Number, Article Letter and Booklet Edition Number. (This is the Fourth Edition)

G. F. E. Duplex Air Compressor

Various Parts

Figure 1 shows the Compressor complete bolted to a special floor stand.

Figure 2 shows the Compressor complete mounted on a base and driven by an electric motor.

Figure 3 is a sectional view of the Cylinder and Valves.

A—is the Cylinder.

B—is the Piston with grooves for holding the lubricating oil, which should be heavy cylinder oil.

C—is the Inlet Valve Casing.

D—is the Outlet Valve Casing.

E-F—are Nuts for enclosing the Check Valves G.

G—is a Check Valve made of Tobin bronze 1″ in diameter, 1-16″ thick. There is a small spring under the Check Valve G in the Outlet Valve to hold it against the seat.

H—is the Valve Chamber Housing.

Figure 4 is a plan of the under side of the Valve Chamber Housing H, showing the location of the two Inlet and two Outlet Valves. The inlet and outlet ports are plainly marked on the Housing.

Figure 5 shows one of the Valves complete removed from the Housing.

Care and Maintenance

Compressor should be in a clean place, free from dust or dirt and should take in cold dry air, as humid air will condense in the cold pipes of the sprinkler system.

Care should be taken to see that the Compressor is thoroughly oiled in the crank shaft and connection rods. The Piston B (Figure 3) should be well oiled with a heavy cylinder oil, care being taken not to flood the Cylinder, for if it is flooded the Valves G will clog so that they will become inoperative. Care should be taken to have the bearings properly bolted down so as to have no play, but care should be exercised not to clamp the bearings too tight on account of the danger of overheating and consequent injury.

Should the Compressor fail to work, remove the Inlet and Outlet Valves C and D shown in Figures 3 and 5 from the Housing H and thoroughly clean the Cylinder A, Piston B, and Valves C and D. Never use gasoline or kerosene for cleaning the Compressor. After thoroughly cleaning the Valves, put them back into position and oil the Piston B with a good cylinder oil, taking care not to flood the Cylinder A.

When the above Compressor is electrically driven, care should be taken to see that the motor is kept clean and well oiled and the wires protected from injury.

NOTE:—The information given above also applies to the G. F. E. Single Cylinder Air Compressor.

Other Makes of Air Compressors

Instructions furnished with other makes of Air Compressors should be carefully followed so as to insure proper operation.

See page 87 for general instructions for maintaining the Worthington Vertical Feather Valve Air Cooled Air Compressor.

Steam Fire Pumps

Start the Pump as soon as an alarm is given without waiting to see how serious the fire may be, maintain 80 to 100 lbs. on the Pump Gauge, and pump into the sprinkler and hydrant systems. Control the Pump by hand at the Throttle Valve, cutting out the automatic governor if there is one, and allow the speed to increase as the opening of sprinklers or the bringing of hose streams into use calls for more water. The Relief Valve, which should be set at about 100 lbs., will take care of all sudden closing of valves and hydrants.

Do not be afraid to run an Underwriter Pump at full speed if the demand for water requires it. They are built for hard service, and can generally be safely run at any speed short of serious pounding and vibration.

To Start Pump Promptly

1st. Open the Priming Valve, the four Air Cocks on top of the water cylinders, and give the Pump a free vent through one of the hose valves or other convenient opening on the discharge. See that the four Drain Cocks on the bottom of the water cylinders are closed.

2d. While the priming water is entering the water cylinders, see that the drips on the steam cylinders are open, and blow all condensation out of the steam pipe through its drip.

3d. Start the Lubricator on the steam pipe and give the Hand-Oil Pump a few strokes; also see that Discharge and Suction Valves are wide open.

4th. As soon as the priming water spurts from the four Air Cocks, close the Priming Valve, turn on steam, slowly at first, and run the Pump at moderate speed until solid streams of water are coming from the Air Cocks and opened hose valve or other vent; then close the cocks and vents, and bring the Pump up to the pressure required.

5th. After the Pump has been run a few minutes, close the steam drain cocks and adjust the cushion valves so as to get full stroke and the smoothest action. Then stay at the Pump and keep the pressure at 80 to 100 pounds.

If the pump is started before the water cylinders have been filled, priming water is usually wasted and delay incurred. A liberal vent to the atmosphere through an open hose valve or other outlet is the surest way to free the suction pipe and pump from air. This is necessary before the pump will run properly.

If the pump does not take a full supply of water at each end of each side, open the air cocks again and allow air to escape until the pump runs evenly. If water is not obtained on the first trial, repeat the priming until it is obtained. (Priming and venting are usually unnecessary where pumps take water under a head.)

When a pump refuses to run smoothly, the trouble is usually at the water end. Obstructed strainers and obstructed or leaky suction pipes will cause the pump to run in a jerky manner. If a suction valve gets caught up, broken or lost, the pump will run lame, and the fault will be in the corner of the pump toward which the plunger makes a quick jump. In the case of a faulty discharge valve, the trouble will be in the opposite end.

When a pump is once under way, it should run smoothly and without serious pounding up to its full rated speed and even considerably faster when setting on a solid foundation and supplied with ample water through a suction pipe of moderate length and lift. With long suctions and high lifts, it will not usually be possible to run the pump as fast as when under more favorable conditions; but it should always be possible to maintain the rated speed.

Care of Pump

Run the pump for a few minutes once a week, until water is solidly discharged at nearly full speed and pressure through the relief valve or some other convenient opening, so as to make sure that the suction pipe, strainers, etc., as well as the pump itself, are in proper order.

Keep steam cylinders and valves free from rust by liberal lubrication. Occasionally examine the inside of the water cylinders to see that all valves are clear of obstructions and in good order. The exposed working parts liable to injury from rust and dirt should be maintained in a clean condition and all bearings kept oiled. Pump rooms should be clean, orderly, free from miscellaneous storage, and well lighted and heated.

Always keep the Pump ready to start at a moment's notice.

Rotary Fire Pumps

Start the Pump as soon as an alarm is given without waiting to see how serious the fire may be, maintain 80 to 100 lbs. on the Pump Gauge, and pump into the sprinkler and hydrant systems. Where the speed can be regulated, control it by hand and allow it to increase, up to full speed, as the opening of sprinklers or the bringing of hose streams into use calls for more water. Where the speed cannot readily be changed, keep the Pump at full speed and allow any excess of water to escape through the Relief Valve. The Relief Valve should be set at about 100 lbs. and will take care of all sudden closing of valves and hydrants.

Spring relief valves should be used in all cases, and when set at 100 lbs. should discharge the full capacity of the pump at a pressure not exceeding 125 lbs. For pressure gauges, five-inch duplex spring pattern are recommended.

To Start Pump Promptly

1st. Close the Drain Cocks, prime the Pump when water is taken under a lift, and then close the Priming Valve.

2d. See that there is nothing in the way of shafting and gearing operating the Pump, and that the Suction and Discharge Valves are wide open.

3d. If driven by friction, force the gears firmly into position and throw out the mill shafting if there are clutches for this purpose. If driven by sliding gears or jaw couplings, shut down the power, and when the shafting stops throw the Pump into gear and start the power again. As soon as the Pump is connected bring the pressure up to the required point.

4th. Stay at the Pump, oil bearings, keep friction gears firmly in contact and maintain the pressure at 80 to 100 lbs. Do not be afraid to run the pump at full speed as long as the fire lasts.

Slipping frictions, which are one of the most common faults in rotary pumps, cut down the capacity and pressure and often seriously wear the gears. If friction gears are properly set up and are clean and dry and forced firmly in place and kept there, they will carry the power easily. For proper running, gears and shafts must be exactly parallel when the frictions are in contact, and the gears must be in perfect line so that all the grooves bear evenly. Should frictions slip in a severe fire, when forced together as firmly as considered safe, a little fine sand may be thrown on, but sand should not ordinarily be used as it cuts and unduly wears the gears.

Do not throw in spur gears or plain jaw couplings while running, as they are almost sure to be broken if this is done.

Where there are no clutches so that the main shafting has to run when the pump runs, the main belts may be cut in case of a severe fire if necessary to save power for the pump or to keep the belts from fanning the fire. With friction gearing it will frequently be best to throw on the pump without shutting down the mill so as to get high pressure water on the sprinklers at the very start of the fire.

Care of Pump

Turn the pump over weekly so as to prevent sticking by rust. Do this where possible by throwing on the power, as this in addition makes certain that the frictions or other gears are in proper working order.

Turn a small amount of heavy oil into the pump after each time that the pump is used with water, and give the buckets a turn or two to spread the oil over the inside of the case and cams. Keep the pump clean, free from rust, and all parts well oiled. Friction gearing should be kept clean and dry. The pump surroundings should be kept clean, orderly, free from miscellaneous storage, and well lighted. Sufficient heating should be provided to prevent any possibility of the pump freezing.

Always keep the Pump ready to start at a moment's notice.

Centrifugal Fire Pumps

Start the Pump as soon as an alarm is given without waiting to see how serious the fire may be, and pump into the sprinkler and hydrant systems. With the usual type of Direct Electric Drive, the Pump will come up to full speed immediately. If the drive is by Steam Turbine, bring it up to full speed gradually and keep it there even though water flow is small. Centrifugal Pumps are so designed as to be able to pump against a closed system for a considerable period without injury to either pump or driving unit. Under such conditions excess water will escape through the Relief Valve usually provided to take care of surges from sudden closing of valves or hydrants, but no harm will come to the Pump if there is no such valve.

If an electrically driven pump automatically controlled by pressure fluctuations has been started automatically and is starting and stopping frequently due to small demand for water it probably will be well to close the manual starting switch, thereby maintaining the pump in steady operation irrespective of the quantity of water flowing.

To Start Pump Promptly

1st. If Pump is dry, close Drain Cocks. Open Supply Valve if supply is under pressure, or turn on priming water if suction is under lift. Open Starting Valve or Umbrella Cock for a moment to let air out of pump casing. Open Discharge Valve.

2nd. If electrically driven, first close the Circuit Breakers; second close the Knife Switch and, if acceleration thereafter is not automatic, then move the starting handle to running position in accordance with particular type of control.

If Pump is turbine driven, observe usual precautions with regard to starting up a cold steam unit, attending to drips, etc., and do not let excitement of the moment lead to reckless haste in starting the Pump.

3rd. Check up lubrication of driving unit and see that oil rings on Pump are in motion.

4th. In cases of unusual demand the pump speed may be increased up to ten percent with safety if means for so doing are provided. Some electric control panels contain a special switch provided for this purpose.

Care of Pump

Pump should be started weekly to prevent sticking and to see that the unit is in proper working order.

Keep oil wells filled with good grade of oil and see that oil rings revolve and do not get gummed and stuck. Wash out oil wells occasionally and refill with fresh oil. Never drain old oil, however, until supply to refill wells is at hand. When washing out with kerosene or similar substance always rinse out wells with a filling of oil before final refilling.

Keep glands moderately tight but be sure and not get them too tight. The glands on some makes of pumps need only to be tightened by *hand*. They are supposed to leak a little. Use a high grade square asbestos packing, do not crowd it in, and always try pump after each gland adjustment.

Keep surroundings clean, orderly and free from miscellaneous storage. Provide ample light.

Wipe off pump unit regularly and blow dust from rotor of motor and from switchboard with a hand bellows.

Sufficient heating should be provided to prevent any possibility of the pump freezing.

Always keep the Pump ready to start at a moment's notice.

Repairs and Extensions to Sprinkler Systems

Repairs to Sprinkler Systems should be made promptly and only by workmen thoroughly familiar with the work to be performed. This applies to the Sprinkler Equipment in general, but it is vitally important when repairs are to be made to such Fire Protection Specialties as Alarm Valves, Dry-Pipe Valves, Accelerators, Water Motor Alarms, etc.

Extensions to Sprinkler Systems should only be made by men experienced in this branch of the piping industry, and then in accordance with plans which have been approved by the Insurance Company having jurisdiction. Before extensions are made to Dry-Pipe Systems, it is also essential that the size of the present system and of the extensions be carefully figured to insure that the Dry-Pipe System will not be overloaded, thereby making it slow in operation.

We have a large corps of contracting men and engineers who are thoroughly competent to advise you regarding repairs or extensions to Sprinkler Systems. We also have a large force of trained installation men to take care of such work. A request to any of our offices listed on page 97 will receive prompt and courteous attention.

NOTE:—For further information on repairs or replacements of:
Alarm Valves and Alarms, see page 43.
Dry-Pipe Valves, Accelerators, Alarms, etc., see pages 84 to 86.

Replacement Sprinkler Heads

All Insurance Requirements state that a specified reserve supply of Sprinkler Heads shall be kept on hand at all times, so that in case of a fire the heads which open can be quickly replaced and the system again put in commission.

It has been our custom for many years to furnish with each new installation a Sprinkler Cabinet containing a supply of Sprinkler Heads of the same types and temperature ratings as those installed, together with a special Sprinkler Head Wrench for use in installing each of the two types of Heads. The special Wrenches should be used in all cases, as a pipe or monkey wrench may badly crush or otherwise damage the Sprinkler Head.

Sprinkler Cabinet
Closed

Sprinkler Cabinet Open, Showing
Sprinkler Heads and Wrenches

The illustrations above show the Grinnell Sprinkler Cabinet, closed and open. Both the Solder Type and the Quartz Bulb Heads are shown with the proper Wrench for each type. The instructions on the inside of Cabinet Cover list the maximum room temperatures for the different temperature ratings for each type of Sprinkler Head. This Cabinet should be located in a convenient and safe place where the room temperature will not exceed 100° F. and where it will not be subjected to fumes of a corrosive nature.

If you do not have a Sprinkler Cabinet to properly take care of your reserve supply, or do not have the proper Sprinkler Head Wrenches, we recommend that you order the necessary material without delay.

Grinnell Inspection Service

In order to assist owners of Grinnell Sprinkler Equipments and other fire protection devices in maintaining their apparatus in the best possible condition this company maintains an Inspection and Service Department.

This department is under the direction of a fire protection engineer of national reputation and wide experience in all matters which pertain to fire protection. Under his instruction a corps of our practical sprinkler men have been especially trained for this important work. These men are Sprinkler System Specialists thoroughly acquainted with each and every detail of automatic sprinkler protection and they are ready to assist the owners of Grinnell Sprinkler Systems in maintaining their equipment at 100% efficiency.

Due to our large organization with offices in all the principal cities of this country and Canada, this company is able to furnish its Inspection Service to owners of Grinnell Sprinkler Systems wherever they may be located. Many sprinkler systems have been installed in places which are not easily accessible and we realize that some of these equipments have not been thoroughly examined for a considerable time.

The Grinnell Inspection and Service Department makes frequent periodical inspections of each feature of the sprinkler equipment. Our inspectors tell the property owner of any conditions such as closed gate valves, low water in gravity tanks, etc., and have proper corrections made while they are in the premises. A detailed, technical report showing conditions found at each inspection is sent in by the inspector to our headquarters. Here the report is rewritten, the technical details omitted and the various matters of interest are presented in a readable manner to the property owner. Our inspectors also make suggestions for improvements which they believe are desirable from the property owner's standpoint and these also are written up in the form of recommendations or suggestions for consideration by the owner of the equipment.

The inspections as made by this department are entirely in the interest of the owner of the property or buiding. They are made with the thought of assisting the property owner in having at all times the complete protection which he purchased and which he should expect from his sprinkler equipment.

Hundreds of owners of Grinnell Sprinkler Systems have had this service for several years. They have found that our inspections and reports not only assist in keeping the entire equipment in good order but that by promptly remedying defects brought to their attention by our men they are able to effect real economies in maintenance. Our men co-operate with plant employees and show them how to care for the sprinkler system and have it always ready to operate in case of fire.

The fact is that sprinkler equipments are too often neglected after they are once installed. Many concerns which give careful attention to their other operating machinery and premises forget that they have a sprinkler system and do not give it necessary attention. This does not mean that a sprinkler equipment is a complicated apparatus or that it requires more attention than any other apparatus of equal importance. What we wish to emphasize is that the importance of the sprinkler system to the conduct of business warrants the owner in giving that equipment proper care.

It has been found that our inspectors by making frequent inspections and careful examinations of sprinkler systems actually perform a service of great importance which in many cases is badly needed. Scarcely a day passes but what our inspectors discover one or more serious defects which are due, ninety-nine times out of one hundred, to neglect or carelessness. Our

men frequently report conditions which if not corrected would actually prevent the sprinkler equipment from performing its intended function. Because of their familiarity with sprinkler systems our inspectors detect faulty conditions which in some cases have existed for a long time.

In order that a large number of owners of Grinnell Sprinkler Systems may have the benefits of this service the charge for our inspections is made as low as possible. It barely covers the cost of the time required and the expense involved in making the regular visits of inspection.

So far as we know, there is no other service like ours which has these unique features:

1st. It is purchased by the owner of the sprinkler equipment at his own expense and for his own advantage.

2nd. Our inspections are made by practical sprinkler men who also know the theoretical side of automatic sprinkler protection.

3rd. The owner receives a written report of each inspection showing conditions found and suggestions for the improvement of existing conditions.

4th. Suggestions for improvement are presented to the property owner only, and are for his consideration; it is optional with him whether he carries out the recommendations or not.

5th. The cost of our service barely covers the time involved and expense to us for doing the work.

We shall be glad to give you further information on this important subject and a letter addressed to our Executive Offices will have prompt attention.

GRINNELL COMPANY
INC.

AUTOMATIC SPRINKLER SYSTEMS

IN the field of automatic sprinkler protection Grinnell is the recognized leader. This is due partly to the superiority of the Grinnell head, but to an even greater extent to rigid adherence to high standards of engineering and construction. There are more Grinnell systems in use than all others combined.

FITTINGS—HANGERS—VALVES—PIPING SUPPLIES

IN the development of its own sprinkler contracting business, Grinnell Company, to insure low installation cost and high quality of completed work, began the manufacture of its own fittings and later designed and made a complete line of adjustable hangers. Such a line now includes types and styles of hangers covering practically every requirement in piping installation work. Increased facilities now allow us to offer these products for sale in large quantities. Catalogues and descriptive booklets will be sent on request.

PIPE BENDING—WELDING—LAP JOINTS—ETC.

GRINNELL COMPANY at its Auburn, R. I., Warren, Ohio and Atlanta, Ga. plants has complete facilities for making power piping accessories of this kind. The most recent addition is the Grinnell line of Triple XXX products for Super Power;—a line providing lap joints of hitherto unheard of strength due to special manufacturing processes and machinery. Folder descriptive of this most recent Grinnell development sent on request.

HUMIDIFYING EQUIPMENT

THROUGH our subsidiary, The American Moistening Company, we are in a position to offer humidifying equipment that has been standard in the field since 1888. The line is complete including both head and atomizer types and an automatic humidity control of unusual sensitiveness and reliability.

GRINNELL COMPANY INC.

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260 West Exchange Street, Providence, Rhode Island

EASTERN CONTRACTING OFFICES

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Plants at Los Angeles, California
Oakland, California
San Francisco, California

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